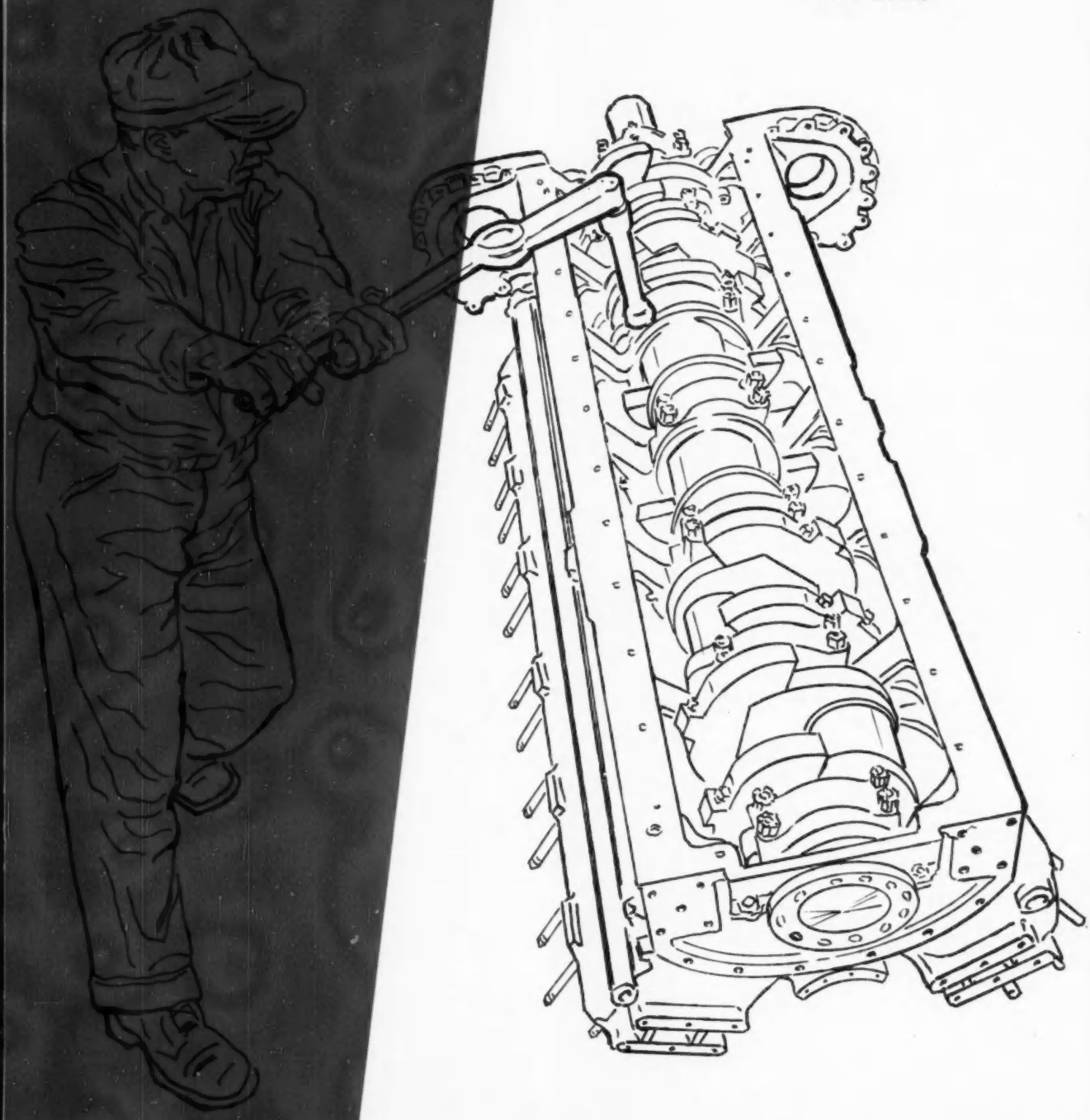
# diesel power

June 1958



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from
less fuel
with
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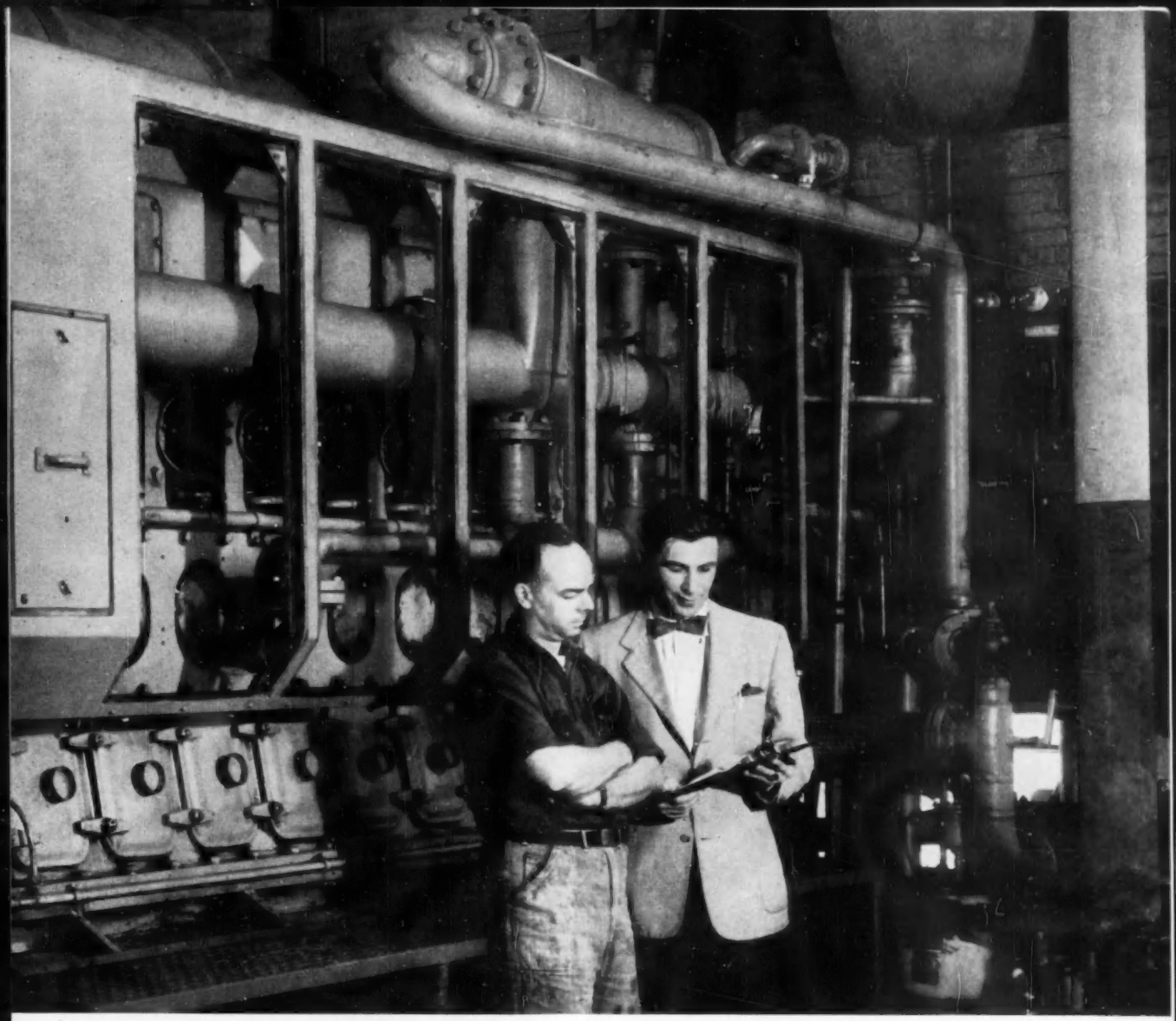

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(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

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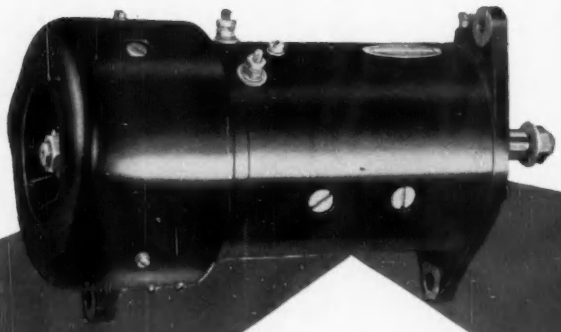

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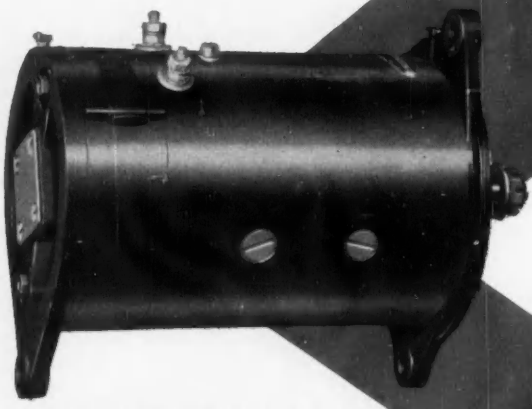

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**NEW PIGGY-BACK GENERATORS**

Extra power with economy! Tailored extra output in single voltage systems. You can use *both* 6- and 12-volt d.c. units on the same vehicle.

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- *Sealed* field coils— impervious to moisture and corrosion
- *Double* insulated armature coils— nylon and cotton
- Hot-impregnated armature for extra insulation
- Dynamically balanced armature
- Wider, heavier brushes— service up to 100,000 miles is common

# ALL THE BASES!

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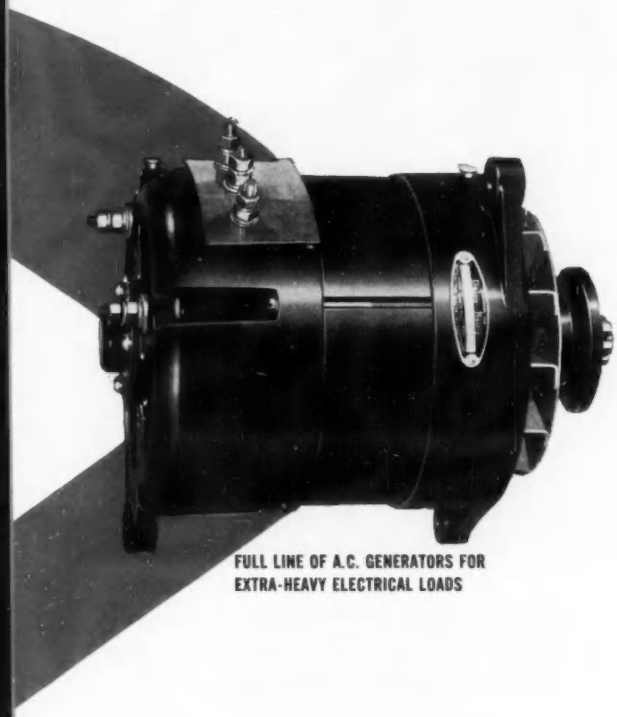

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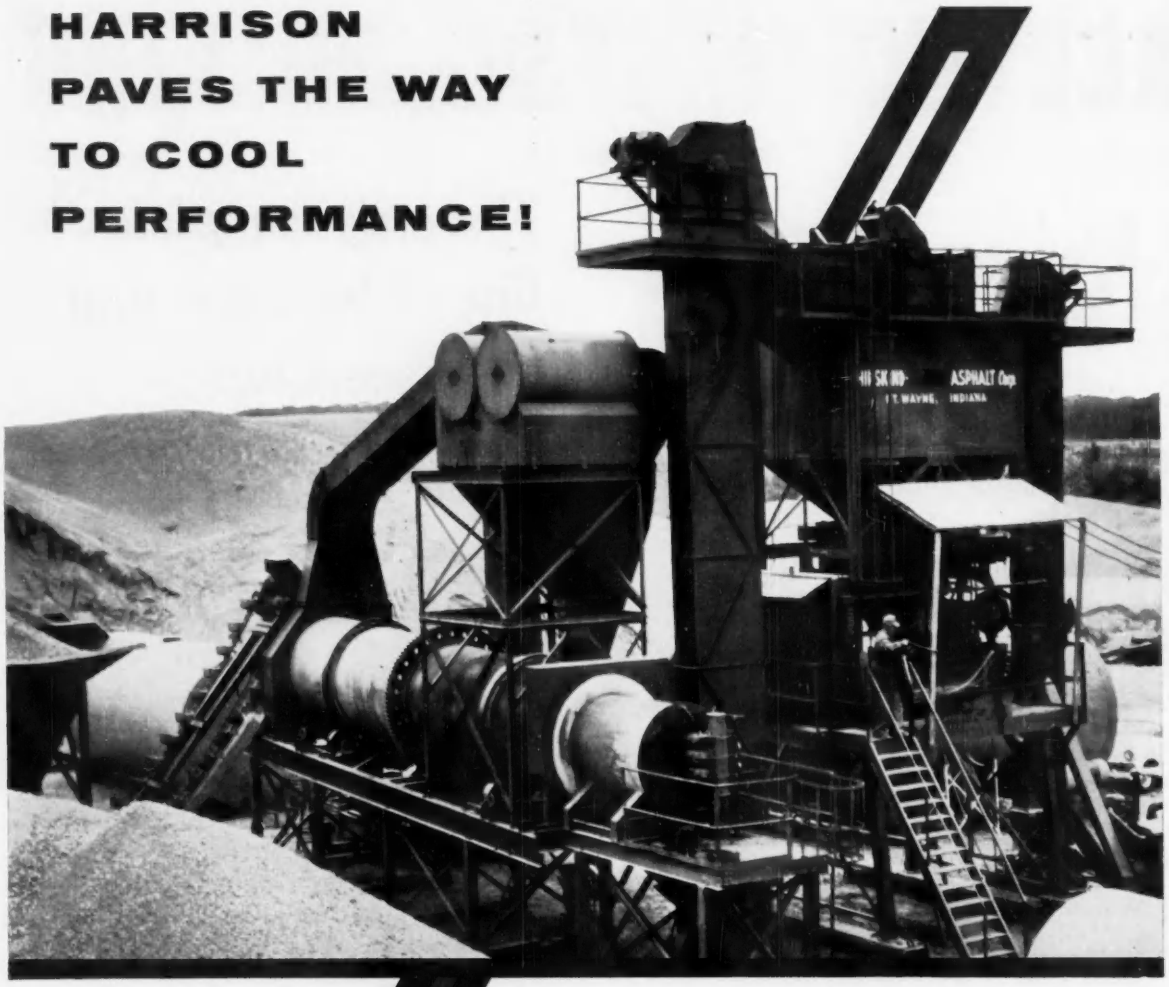

Temperatures made to order for all types of diesel engines. Harrison heat exchangers are rugged, reliable and compact . . . engineered to provide the optimum in cooling efficiency.

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TEMPERATURES MADE TO ORDER

HARRISON

FROM THE PROGRESS OF THE PAST — GM — THE PROMISE OF THE FUTURE

HARRISON RADIATOR DIVISION • GENERAL MOTORS CORPORATION • LOCKPORT, NEW YORK

# editors notes...

## You'll want to read about...

How an oil company increased power and efficiency of engine-compressors by adding turbochargers (Page 16). Engineering considerations and details of the work are covered in this first of two parts. Next month, the second part will deal with changes in operation and maintenance after conversion . . . .

Automatic controls for small engines (Page 22) that assure continuity of power in installations where this is vital. Unattended operation in remote areas is a typical case . . . .

A diesel power package that provides both electrical and mechanical power for an offshore drill rig (Page 24). Compact and efficient, it provides the versatility to meet all anticipated requirements . . . .

How higher-capacity equipment boosted a quarry's output while cutting costs (Page 26). Today's bigger, more-efficient machines are reducing unit costs, whether tons or yards of dirt moved. Maybe you should be using this new equipment . . . .

A 6000-kw, 3-unit transportable power plant designed to solve many of the utilities' problems (Page 28). Where demand is pushing central station capacity, where distribution is a problem, and in emergencies, these are a low-cost answer . . . .

A new degree of power unit interchangeability in drilling equipment (Page 29). Identical skid-mounted power units serve draw works, mush pumps, etc. and one standby unit provides immediate replacement where needed . . . .

## You'll want to read about...

Some why's and wherefore's of crankshaft failures (Page 30). Also discussed are ways to recognize basic causes of failure so that you can track them down and correct them. There are ideas on preventing them too . . . .

Four new Mercedes-Benz models now available in this country (Page 32). With addition of these models, Curtiss-Wright has rounded out the horsepower range they offer . . . .

A diesel standby for a windmill (Page 33). Wind power, like hydro power, is fine when available. But winds die and water drops so to make them really practical for continuous power supply, you need a diesel backup . . . .

Things to know and do when you put new rings in your engine (Page 34). Rings have it tough enough under the best conditions. So the better you make the conditions, the bigger your payoff in improved performance and longer life . . . .

Cleaning the engine's "innards" without taking it apart (Page 37). Do it right and it's a real money-saver. Here's how a locomotive diesel was desludged but don't get the idea that it only works on the railroads. Could be it can save you money too . . . .

A case where good maintenance paid off (Page 38). Next time you ask yourself whether all this preventive maintenance is worth the time and trouble, just repeat to yourself, "25,000 hours, 25,000 hours." You'll be sold.

This month we have a new feature called "Products at Work". We'll run this from time to time to show what can be done and what products are doing it. Who knows? Perhaps they could do it for you too.

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BPA

# diesel power

**Established in 1923** **Vol. 36, No. 6** **June, 1958**

**The Magazine of Piston and Turbine Power**

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Model WH Hi-Capacity Fulflo Filter with optional Cover-Lifting Device and Pressure Gauges. Note compactness and simplicity of inner assembly.

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A few settings will give you all engines by make and model that can be considered for any specific application under any specification, giving you the required BHP, BMEP, RPM, piston speed and displacement of each individual model for each particular situation.

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# BULLETIN

CITIES SERVICE

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# 16,000 HOURS WITHOUT OVERHAUL!

Bradford Weston Inc., of Hingham, Massachusetts is getting the kind of diesel performance many a maintenance man dreams of.

Since 1947, their diesel quarry shovel has operated more than 16,000 hours without overhaul, using Cities Service Diesel Engine Oil!

Two factors enabled this performance. First, due to extremely dusty conditions, Bradford Weston made oil changes every 150 hours and changed filter every 500 hours. Second, the extremely effective additive formulation in Cities Service C-300 Diesel Engine Oil held sludge, carbon and varnish to the barest minimum.

Examples of truly outstanding performance such as this are not unusual where Cities Service Lubricants and the Cities Service Lubrication Engineer have been at work. If you're not getting all the hours of work you think *your* equipment should give, call in the man from Cities Service. He'll gladly make a free lubrication survey. Contact the nearest office or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

## 225,000 Miles—Needs No Overhaul!

Another exceptional performance record has been set by this diesel-driven rock truck at Bradford Weston. Since 1952, it has provided constant heavy-duty service without overhaul, using Cities Service C-100 Diesel Engine Oil. Heavily fortified and highly detergent, Cities Service C-100 Oil is often used where maximum load or overload and high engine temperatures prevail. It is also excellent for intermittent-load, low temperature operation.

## MAN YOU SHOULD KNOW

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## Birth of A 20 Ton Sailor

Looks like any other *seventy-two* inch steel ingot —but is it? Trained down to fighting weight, it is a *twenty* ton sailor aboard an oil tanker . . . a ship's shaft to turn propellers against the heavy seas of the North Atlantic. Its "trainers" . . . experts in forging, heat treating, machining . . . men of long experience in quality control carefully check every step of the way to make sure it holds its "rating" in the ship's company. Steel forgings and castings for naval and maritime fleets are completed here from raw materials to shipping dock . . . have been for over three quarters of a century. Another of the many important reasons you can consult with us on *your* Steel Forging and *your* Steel Casting Components with full confidence.

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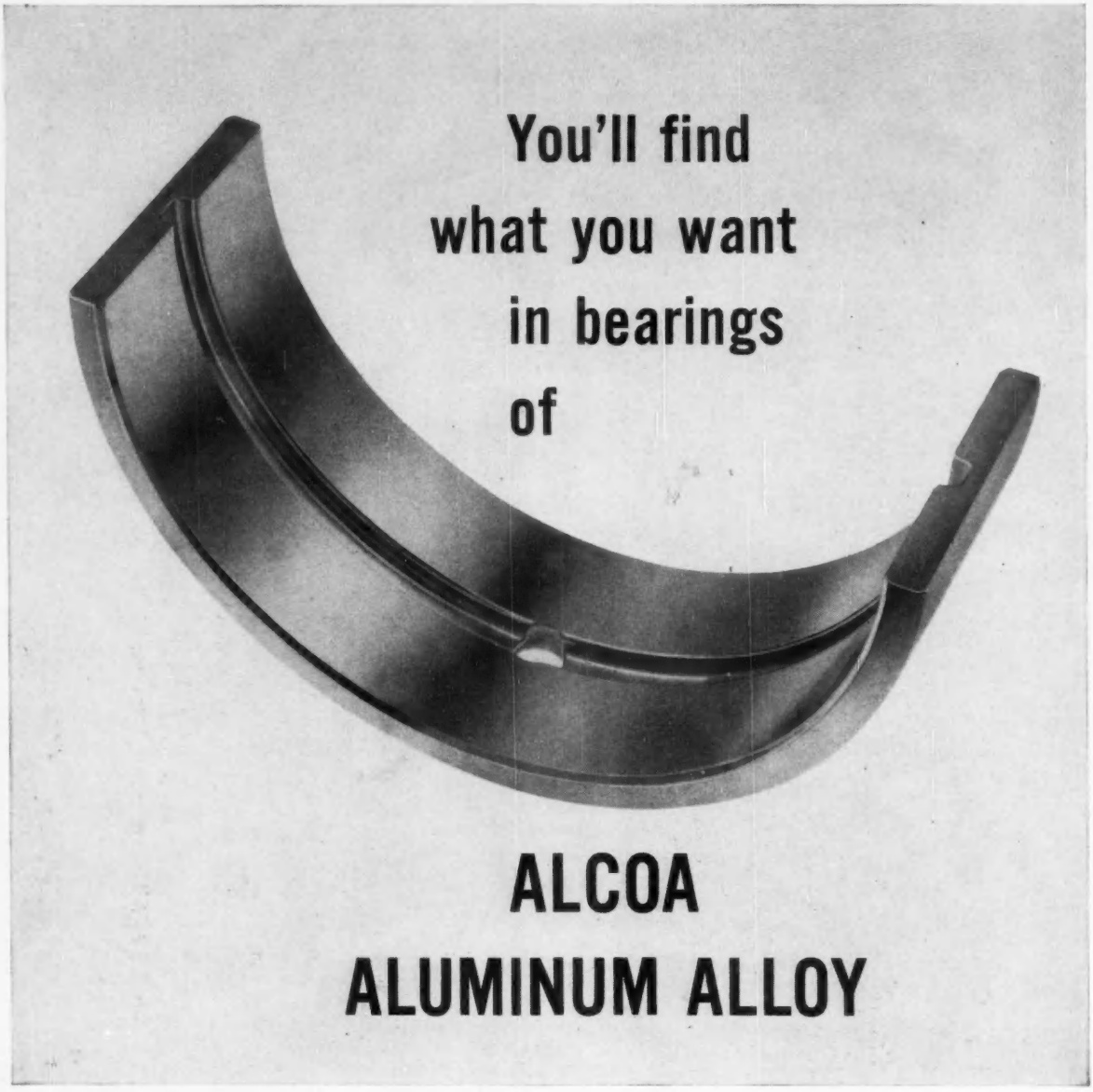


*Ability to carry heavy loads* . . . up to 10,000 psi on projected area.

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*Good Conformability* . . . Aluminum has good ductility, conforms readily to misalignment of shafts or nonparallel pins.

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*Design Flexibility* . . . Aluminum has it; structural properties allow for greater flexibility in design . . . ease of machinability, too!

For more information on the unmatched combination of advantages in solid aluminum alloy bearings, call your nearest Alcoa sales office. Or, write to Aluminum Company of America, 1988-F Alcoa Building, Pittsburgh 19, Pennsylvania.

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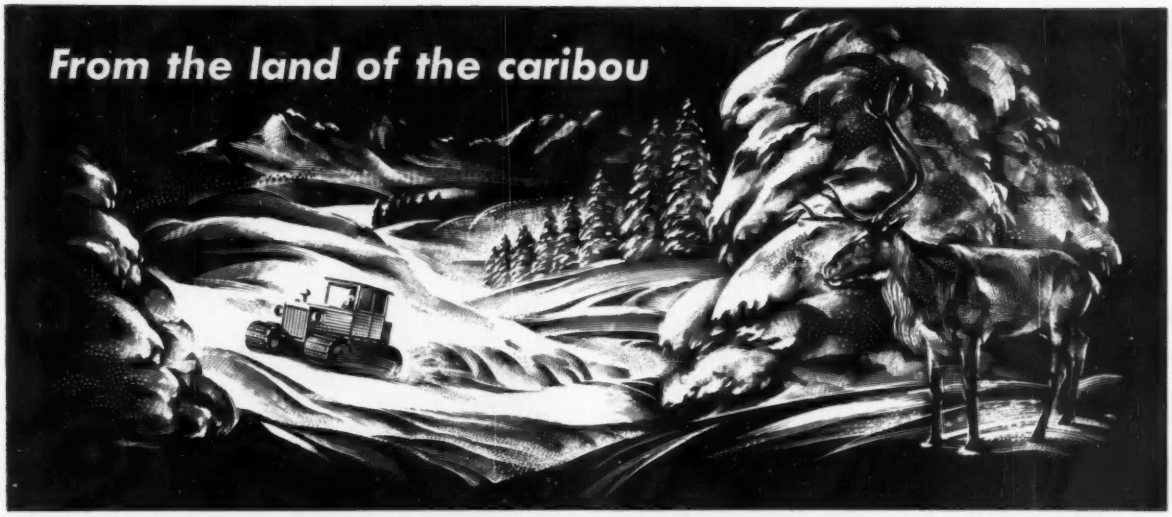


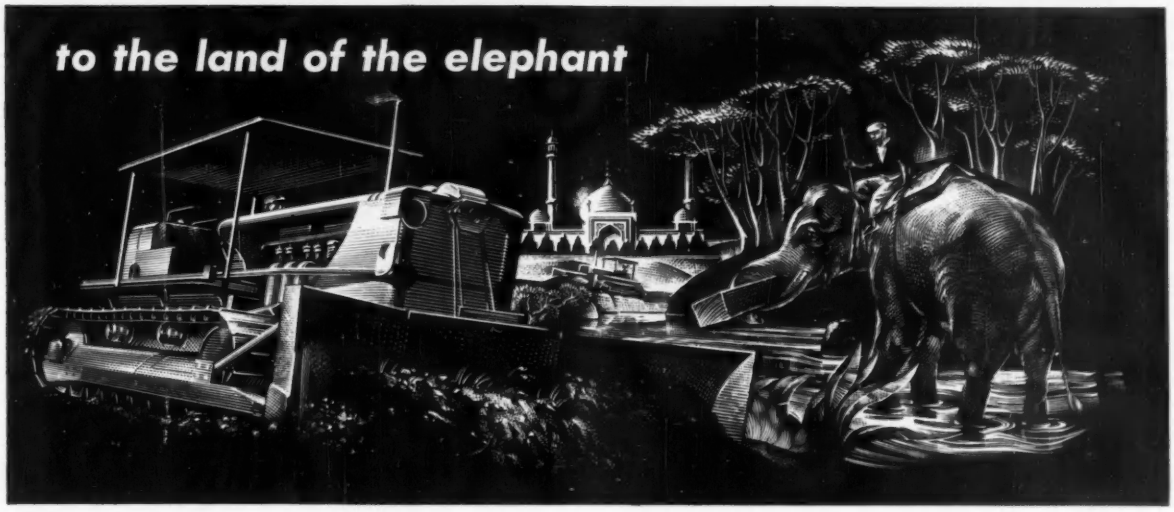


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**Shell Voluta Oils**—for high-speed quenching with maximum stability

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Shell Rimula Oil is a heavy-duty oil designed to solve the toughest lubricating problems in diesel engines.

One of these problems—excessive cylinder and ring wear—results from acidic combustion products. It occurs under all operating conditions, but is especially severe under low jacket temperatures. Rimula® Oil contains an alkaline additive that counteracts this acid wear. It remains stable under the widest temperature extremes encountered in modern operation. It keeps engine parts clean and operating efficiently over longer periods . . . effecting worthwhile savings in labor and parts.

Rimula Oil is available to your customers abroad. They can depend upon it for the most severe conditions of diesel operation. For full information, write: Shell Oil Company, 50 West 50th Street, New York 20, New York, or 100 Bush Street, San Francisco 6, California.

# SHELL RIMULA OIL

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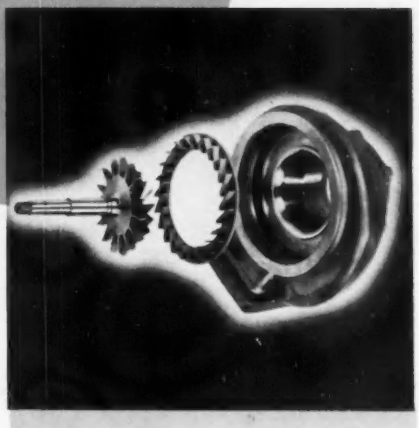
Moving parts in the new-design Thompson Turbocharger for diesel engines are made of light alloys to reduce inertia to speed changes. Response of the Thompson Turbocharger to variations in engine speed and air requirements is almost instantaneous . . . no ragged engine performance due to lag in blowing.

The light alloy impeller also permits bearings to be simpler in design. Shafts can be smaller in diameter to reduce bearing surface speeds and increase bearing life.

Other advantages of the new Thompson design include: straight-bladed impeller for high pressure ratios over wide range of air flow, new-design diffuser for peak performance over wider operating range, and unique design to isolate exhaust heat from bearings and air-side of Turbocharger.

Your diesel engines up to 300 horsepower can readily be equipped with Thompson Turbochargers . . . the most modern design available. A Jet Division engineer will call at your convenience to work with your engineers.



**Write today on your company letterhead for Booklet DP-658, which contains technical data on Thompson Turbochargers for blown diesel engines up to 300 horsepower.**

JET DIVISION

**Thompson Products, Inc.**

Cleveland 17, Ohio

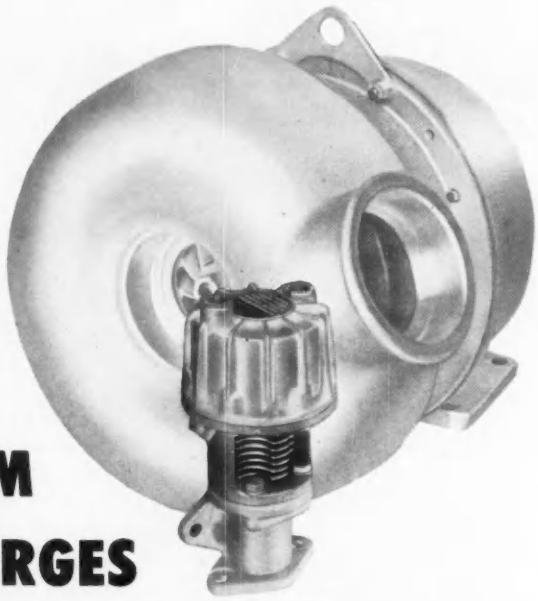
# Editorially speaking -

## Bargain or Racket?

If someone came up to you on the street and offered you a 2-carat diamond for fifty bucks, you'd give him a fast brush. Why? Because common sense tells you that there's a catch; if the stone is any good it's worth more in the local pawnshop. Yet every day, people are falling for sucker deals in the repair field that are just as phoney. Bargain hunting appears to override common sense. Get enough of these "bargains" and they'll break you. Let's be specific. One field with more than its share of cutrate deals is hydraulic governor overhaul. What's happened is that in several areas across the country the fuel injection and governor repair business has attracted men to open new shops. Often there is not enough business in the area to support all of them. While some new shops are comers and will earn their rightful place, others are lacking in technical knowledge, skills and even test equipment. All this sets up the climate for real cutthroat stuff—not to be confused with healthy competition. We know of cases where governor overhaul jobs are being bid in at "flat" rates lower than the normal labor charge alone for the particular model governor. Experience factors show a certain average time requirement, wage rates are essentially the same in a given area, parts costs are relatively equal and so the only leeway lies in overhead costs and profit margin—*unless corners are cut in job completeness and quality*. It's just gotta be. And if you buy a cheap job your liability can be much more than its cost. Take one case where a shipyard fell for a "bargain". Back on the engine, the supposedly rebuilt and tested governor didn't work. The job had to be redone, this time in a reputable shop. Cost—a cutrate rebuild, a legitimate rebuild *plus the cost of missing the ship's sailing date by two days!* Now as a customer, how can you protect yourself. First, be skeptical of "bargains". Then, know the shops, their reputation and facilities. The ADS sign is a good recommendation; this organization was formed to help fight malpractice in their field. Finally, use common sense. You only get what you pay for. There's only one thing that you can buy cheap and get more than you bargained for—that's trouble.

BPE

# NEW! AIRESEARCH CONTROL SYSTEM SUPER-TURBOCHARGES CATERPILLAR DW20 AND DW21 TRACTORS



New AiResearch Pressure Ratio Controls *substantially increase lugging ability and travel speed* of Caterpillar DW20 and DW21 Wheel Tractors equipped with AiResearch T-15 Turbochargers.

The new control unit more than doubles the torque rise, giving the tractor greater lugging ability when operating under heavy loads. Accurate control of turbocharger speed over a wide range allows the engine to operate efficiently regardless of its changing load requirements.

This further improves other performance characteristics: *decreases specific fuel consumption ... improves acceleration ... provides cooler engine operating temperatures ... reduces smoking.* The improved air induction system also provides equal rimpull for the new DW20 and DW21 at *10% higher* travel speeds.

The two components of the new AiResearch Pressure Ratio Control unit are a pressure ratio sensor and exhaust by-pass valve. They allow the turbocharger to operate at maximum boost pressure over a wide range of engine speeds and operating conditions, thus maintaining turbocharger speed, and hence engine air input, at higher levels while lugging. This improves the overall performance match of a free-floating turbocharger.

Your inquiries are invited.

THE GARRETT CORPORATION

AiResearch Industrial Division

*9225 South Aviation Blvd., Los Angeles 45, California*

DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND SPECIALIZED INDUSTRIAL PRODUCTS

# highlights

**An experimental model GM diesel, powered a tug to victory twice** at the international tugboat race on the Detroit River. This vee-type, 12-cyl engine, reported to be a non-turbocharged unit developing 450 hp, pushed the 63-ft tug G. F. Becker over a 4-mile course in 17 minutes. It outran all other tugs in both the 300-600-hp class and the unlimited-hp class boats. Another of the Frank Becker tugs, also diesel-powered, competed in the under-300 hp class and won its race handily.

**Of the 41,000 miles of interstate highway planned** 1286 miles are done and 3143 are under construction. Mileage does not give the whole picture however. For example, while 41,000 miles of highway is only 1.2% of the nation's roads, they will handle up to 20% of all traffic. In any case, there's still a lot to be done.

**Diesel-electric locomotives put in service** by Class I railroads totaled 237 in the first three months of 1958. Of this total, 67 units were placed in service in March as compared to 50 in February, according to the Association of American Railroads.

**More truck builders are looking at diesels.** Dodge is reportedly readying a diesel truck for introduction in 1959. It will probably use Cummins engines. Ford is expected to make a decision soon and is reportedly studying the 2-cycle GM and the 4-cycle Cummins engines as possible power for their heavy-duty line.

**Confidence was the keynote** expressed by R. S. Stevenson, president, Allis-Chalmers Mfg. Co. at a recent stockholders meeting. Calling attention to their activities in major basic industries, Mr. Stevenson predicted doubling of the light and power industry in the next decade; that the present highway program would prove inadequate before its completion; that housing construction must continue at high levels; that production capacity for primary metals and other materials must expand. It is significant that all these predictions if they are to come true depend to a great degree on prime mover power.

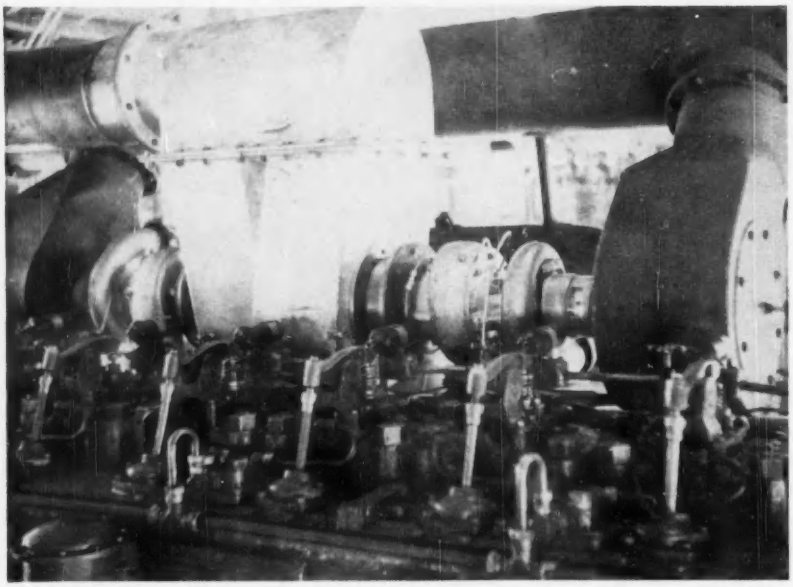
**U. S. natural gas consumption has more than doubled since 1946** according to F. W. Bartlett, Socony Mobil Oil Co., Inc. By 1967 natural gas is expected to be supplying 27% of this nation's energy as compared to the 13% it supplied in 1946. Petroleum will be supplying about 43%.

**Sales of diesel-powered farm machinery are climbing** according to the Minneapolis-Moline Co. Deliveries of farm and industrial equipment by Minneapolis-Moline retail dealers were 33% higher for the first six months of the 1958 fiscal year than for the same period last year. This is attributed to the Company's planned program of inventory reduction in dealer and company stocks of tractors and farm equipment.

**Safety is good business.** A good accident prevention program pays direct dividends to the company initiating it but recognition is nice too. One case of both achievement and recognition occurred recently when Garrett Corporation's AiResearch Industrial Division (turbochargers and specialized industrial products) took second place award in the annual Los Angeles Business and Industry safety contest.

**"Push button and remote" control of engines** and engine compressor units has mushroomed. Pipelines benefit particularly through the concept of system control rather than individual pumping station control. Industrial and municipal installations are also finding many advantages. As installations increase, a new dimension will be added to operation—preventive maintenance and trouble shooting of control systems.

**The oil and gas industry's transportation problems are solved** by efficient use of the same diesel and gas engines for which it provides fuels and lubes. The U. S. oil industry requires nearly 800 billion ton-miles of transportation a year. Its transportation facilities total 180 million barrels. This is adequate, though equal to only 19 days of U. S. total oil production and imports, because of the efficient operation of these transportation facilities, most of which are diesel-powered.

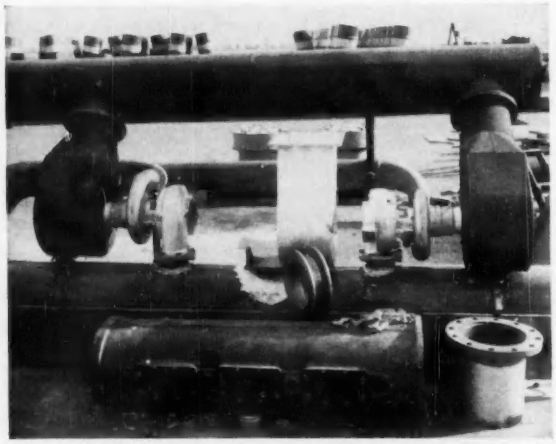


*Close-up of turbocharger installation on the 8-cyl, Model MA-8 Clark right angle direct-driven compressor. Intake air ducting is seen at extreme left and extreme right. Turbochargers are connected to exhaust plenum chambers (center) through stainless steel expansion joint to prevent strains on turbos when they're hot.*

# Need More Power? — Convert By Turbocharging

By C. E. Gotterba — General Supt. Gas Div., Richfield Oil Corp.

**What problems and pitfalls are involved in field turbocharging of gas-engine compressors? What new maintenance problems occur? Here are some answers from the experience obtained by Richfield Oil Corp. engineers in converting several units in the field. This article will be published in two parts. The first part covers the problems involved and the modifications necessary. The second part will deal with maintenance and servicing of turbochargers and engines after conversion.**



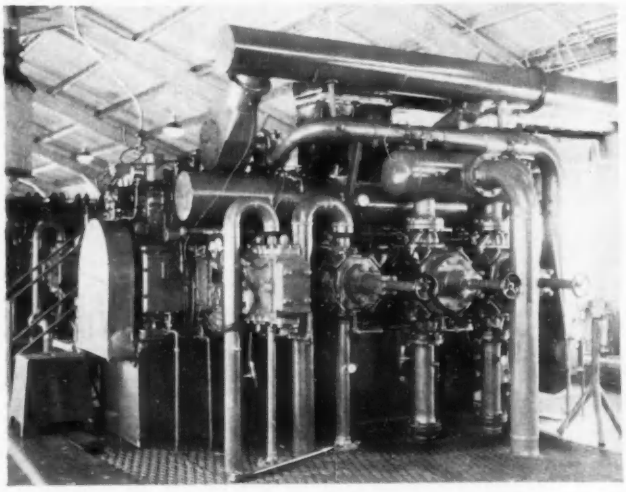
*After insulating and metalcladding the dry-type exhaust manifold, the AiResearch turbochargers and ducting are assembled on it. Wet-type exhaust manifold (front center) removed from engine, is bolted to the dry-type exhaust manifold to keep it from warping during welding of risers. White areas on manifold show insulation around risers. One of the stainless steel expansion joints used between each turbo and plenum chamber is seen on wet-type manifold.*

**Part I**

A LOT of data and experience was accumulated in the course of turbocharging four gas engines in the field. The occasion for this work was Richfield Oil Corporation's need for more power to meet increased injection demands at existing compressor stations. Richfield found that the cheapest and fastest way to get this power was by turbocharging existing units. The units converted were Clark 2-cycle gas engine-compressors.

Though two different Clark models have been converted, and conversion of other engine makes is contemplated, basic problems and modifications are very similar. For this reason, discussion of one model, the Clark MA8, and the modifications made, will be covered and considered fairly typical.

The degree to which this unit was turbocharged depended on the potential capacity of its compressor. For example, there was no sense boosting the output of this unit say 50%, if the compressor output could only be increased 20%. It would have been a waste of money. In all our conversions, the engine horsepower was in-



*Completed exhaust and air piping is ready for mounting on engine. Turbos are in place though not seen.*

*Tapered air line from turbocharger compressor to the air cooler is seen on the compressor side of the Clark MA-8 turbo installation. The wiring, tubing and orifice meter on this line were used for testing.*

creased just enough to carry adequately the new compressor capacity. This required a 15% to 25% increase in horsepower.

**Engine Modifications for Turbocharging**

Because of up-to-date materials and design, later-model naturally-aspirated 2-cycle engines can generally be turbocharged without major modifications. Conversion of older units however, generally includes modernizing with new liners, pistons and cylinder heads to withstand higher-pressure operation after turbocharging.

When Richfield Oil decided that it was economical to boost engine power by turbocharging, the compressor had also been taken into consideration. If the compressor capacity couldn't be increased economically there was not sense in boosting the engine horsepower. Generally these have to be modernized by boring out cylinders or by replacing liners and installing larger pistons. In addition to this, the other compressor components (frame, crosshead, wrist pin, pistons, rods, bearings, etc,) must be able to take the new load.

To confirm your own conclusions the engine and compressor builder should be consulted. Upon contacting Clark engineers, for example, we were assured that both the engines and compressors could take the increased loads if certain modifications were made. These changes and the reasons for making them are covered.

For example, here's what had to be done to the intake and exhaust systems. Water-cooled exhaust manifolds had to be replaced with dry ones to limit exhaust gas heat energy loss ahead of the turbine. Also, they were insulated. Built-in expansion joints were included to compensate for expansion at the high temperatures. Bellows-type expansion joints also had to be installed in the exhaust piping to relieve all strains on the turbocharger housings resulting from the heat.

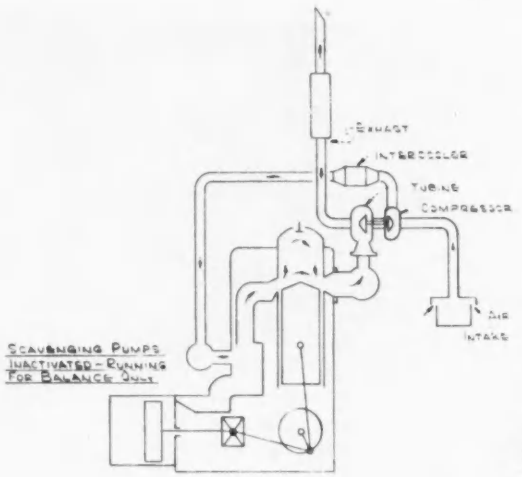
Piping inlets had to be located properly in the exhaust manifold. This depended on the number and location of the exhaust turbines. Risers were used to facilitate installation of exhaust piping from the turbine or air intake piping to the centrifugal compressor. This piping as well as that to and from the air intake intercooler had to be sized, designed and located to give minimum interference to flow yet take up minimum space and provide maximum accessibility.

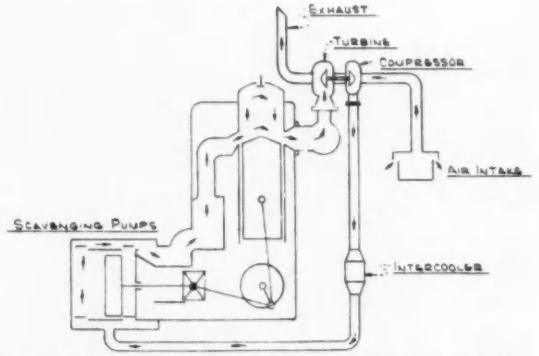
Every precaution was taken to insure that all lube oil and air piping was absolutely clean. In all cases it had to be sandblasted to remove mill scale and slag from welding. In one installation, piping was even galvanized inside and out to insure against metal particles entering the engine with intake air or the turbine with the exhaust gas.

New mufflers were not needed when we converted the smaller Clark units. But the need may exist, particularly when higher output engines are converted, to avoid build-up of excessive back pressure. Similarly, the pressure drop across air cleaners must be considered as high restriction will reduce air flow thus increasing the pressure ratio across the turbocharger and air temperature to the cooler.

As to instrumentation, the oil pressure indicator, jacket water thermometer, overspeed governor and other instruments originally used were retained. However, additional instruments were needed after turbocharging. For example, manometers are now used to check pressure drop in the air intake piping between the air cleaner and centrifugal compressor, between the compressor and intercooler and between the intercooler and intake manifold, also to record crankcase pressure. The original pyrometer was used but with added contacts for checking exhaust temperatures to and from the turbine.

If the units involved are automatically operated or controlled, more instruments are needed. This also applies to use of safety devices. Original safety devices for protection against engine overheating and loss of




*Intake air and exhaust gas flow diagram shows turbocharger on Clark MA-8 working in series with the existing scavenging pump.*

*Intake air and exhaust gas flow diagram of Clark HBA shows centrifugal compressor connected to cylinder air box. Scavenging pumps are inactivated, running for balance only.*

lube oil pressure remain unchanged. However, at least one more safety device must be installed after turbocharging. This is to keep the turbine from running away.

A diaphragm-operated, spring-loaded valve was placed in the fuel line to the engine to prevent this. This valve shuts off the fuel when it is closed by an excessive rise in scavenging air pressure due to turbo overspeeding. Another way to prevent turbo overspeeding is by use of a flow controller and motor valve to bypass exhaust gas around the turbines. This method is also generally controlled by a rise in scavenging air pressure.

One cause of turbine overspeeding in the gas engine is to have the spark retarded too much. Gas may then burn in the exhaust manifold supplying additional energy to drive the turbine. The turbine in turn supplies more air for combustion leading to a spiraling cycle and runaway wheels. This can result in damage to both wheels, bearings and housing.

There were some changes in the lube oil system too. Higher bmep and greater bearing loads made necessary the use of aluminum main and connecting rod bearings in our installation for the engine end. These have 50% greater load carrying ability than babbitt bearings. However, a 25% to 50% larger capacity lube oil pump had to be installed to compensate for the greater oil flow through the increased clearance generally given to these aluminum bearings. This is helpful in providing sufficient oil when clearances are greater during engine starting. It also provides the greater cooling required by a turbocharged engine. Since aluminum is harder than babbit, particles don't imbed in it as easily as in babbitt. Unless lines are flushed out and the oil adequately filtered, the result can be scoring of the crankshaft when these particles are trapped between the bearings and shaft. Of course, it is mandatory with aluminum bearings to prevent this. We improved oil filtration by installing a fine lube oil filter of the full-flow type with no bypass to remove particles down to at least five microns.

A pre-lubrication pump should be installed. This pump should always be used to give the required lubrication to the engine and turbine before starting. The pre-lube pumps may be hand-operated but electric- or air-powered units are preferred for larger engines. We use an air motor-powered pump. They can and should be used if the engine stalls during operation. By helping to remove heat built up in the pistons, damage to rings and liners is prevented.

## Engine Performance and Characteristics

When the above modifications had been completed on one of the Clark Model MA-8's, field tests and operational results conformed with those anticipated by Richfield engineers. Here's a tabulated comparison of the performance and characteristics of this unit at 1800-ft altitude before and after turbocharging.

| | *Clark MA-8 Non-Turbocharged* | *Clark MA-8 Turbocharged* |
|---|---|---|
| HP output | 280 | 355 |
| RPM | 600 | 600 |
| BMEP | 59.6 psi | 73 psi |
| Air requirements | 75 lb/min | 108 lb/min |
| Av. peak firing pres. | 435 psig | 510 psig |
| No. of scav. pumps | 4 | 3 |
| Scav. pump pres. ratio | 1.22 | 1.08 |
| Scav. air to Cyl. | 6-in. Hg | 12-in. Hg |
| Spec. air consumption | 16 lb/hp/hr | 19.7 lb/hp/hr |

Additional turbocharged operational data:

Turbocharging reduces cooling load about 40%.

Turbine speed is 28,000 rpm. (Tests up to 48,000 rpm were made.)

Exhaust gas temperature to turbine is 870°F to 936°F; from the turbine it is 759°F to 847°F.

Pressure drop through air intake filter is kept below 0.24-in. of mercury.

Scavenging air temperature rise through compressor is 59°F to 80°F.

Pressure drop through turbine is about 10.5-in. of mercury.

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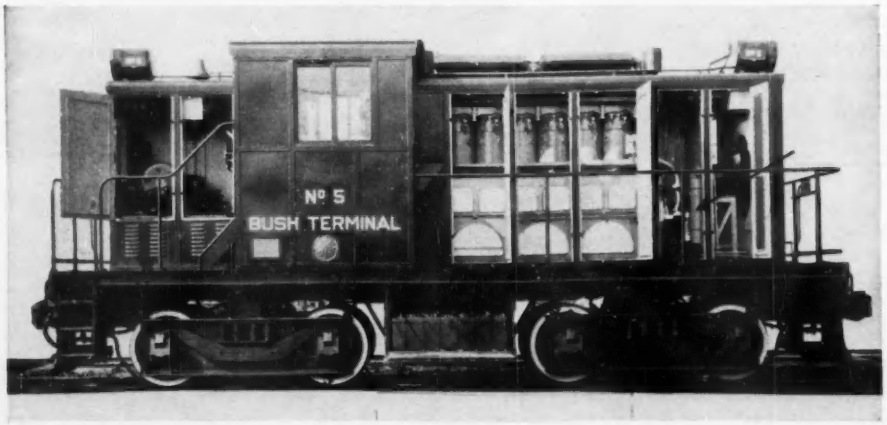
# Products At Work....

*Robert Fulton Control Company's Vibraswitch, a small vibration detector, has already paid for itself many times over by doing so well the job for which it is intended — safety. About $1500 has been saved since the unit was installed on the side of a large compressor. By detecting any change in normal operating vibrations, it triggers immediately and stops the compressor, thus preventing serious damage. It has done this five times since it was installed three years ago. It's low-cost insurance for Pacific Northwest Alloys, Inc., owners.*

*Model 566 automatic wet surface grinder made by Van Norman Automotive Equipment Co., is grinding a Model 1879 Buda diesel engine block. This is said to be the only grinder which positions the work over the grinding wheel. This makes it possible to grind large blocks such as this with the main bearing caps torqued and in position. The same can be done with large assembled cylinder heads, thus eliminating costly disassembly and reassembly time. Coolant is kept down in t`e tank, permitting a cleaner grind. Flooding of excessive abrasive-laden coolant over and through the work is eliminated. There is no limit to the height of work that can be ground on the machine. The Pittsburgh Auto Equipment Co., owners of this machine, have also found it to have many other safety, accuracy, and time and money-saving features which make it very desirable to have.*

*Nugent full-flow, bag-type filters (see arrow extreme right) have been cleaning lube oil on the seven Bush Terminal Railroad locomotive diesels for over 25 years. Though the Ingersoll-Rand diesels powering these locomotives have been used continuously since October 1932, the majority of their internal parts are still the original. C. W. Jud, the railroad's master mechanic, attributes this largely to the effectiveness with which the Nugent filters have kept the engine lube oil systems free from contaminents.*



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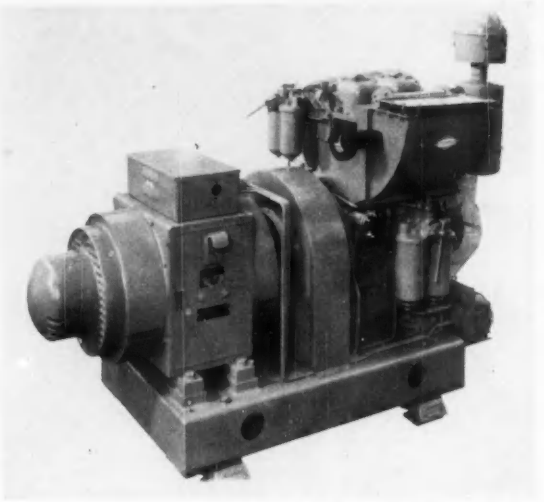
# No-Break Power For Vital Unattended Installations

**Six kilowatts or six hundred—vital installations need uninterrupted power, particularly when remote and unattended. Here are some ways that no-break service is guaranteed when small automatic sets produce the required power.**



*The McLaren Model PD2, 2-cyl, air-cooled diesel-driven, 12-kw generator set is one of the RACO units used in automatic, unmanned stations all over the world. Note the two fuel filters (at left of engine) and two lube oil filters (lower right) which are set up so that one can be cleaned while engine keeps running.*

UNINTERRUPTED operation of some remotely located unattended diesel installations is vital. Millions of lives may depend on it. In such cases, automatic controls must be used to safeguard against power failure and equipment damage regardless of installation size.

Many small unmanned installations are used for essential military services where even a momentary power failure may mean disaster. J. & H. McLaren Ltd., one of the Brush Group Ltd., member of the Hawker Siddeley Group of England, has developed a diesel-electric generating set with automatic controls for just such vital services. Known as RACO, (rapid automatic change-over), the unit will be distributed in the U.S. by Orenda Industrial Inc., formerly Brush Aboe, Inc.

RACO units do one of two things in case of power failure: (1) They insure minimum delay before taking over the load: (2) Where it is vital that there is absolutely no break in power supply, a RACO continuity set insures uninterrupted service.

McLaren's switching system is said to transfer down to three milliseconds. Generating sets using this system may be used either as a direct power source, or where a no-break power supply is necessary, as the power source of an energy storage system. In either application, the control gear is the same.

The basic RACO control panel is a dust-proof, wall-mounted cubicle. It contains all the contactors, relays, etc., necessary to start and stop the generating set when given the necessary impulse from an external source. It also contains fault detecting and signalling apparatus for each individual unit.

If the set is on standby duty, the control panel is energized from the changeover panel of the prime power source. For greater safeguard, the changeover panel can control two sets via control panels. If one set fails to start, or develops trouble while running, the sequence of operation is transferred to the second set.

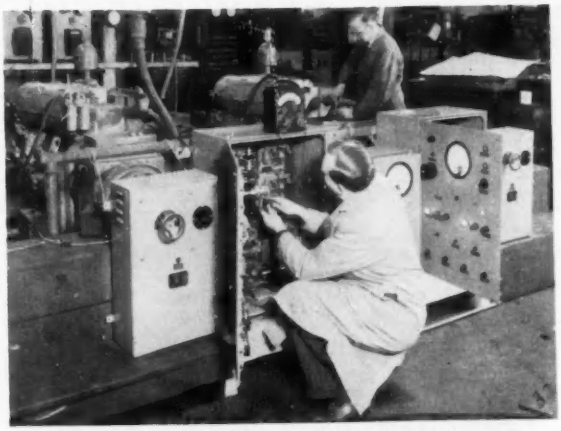
In a station where outside power is never used, dual or triple generating sets are installed, each with its own control panel. The two sets are arranged to operate on 72-hr cycles. If one set is faulty, the load is transferred to the other. In triple installations, two sets share the load cycle, a third is used as a standby. If either of the two sets are faulty, operating sequence is automatically diverted to the third.

### Units in Stations Using Outside Power

When the load is permanently carried by outside power, the RACO set is used as a standby. Sets larger than 6 kw have a lube oil priming pump arranged to operate on a cycle of about three minutes every eight hours.

Upon a 3-second failure or 6% reduction in outside power, the set automatically starts and carries the load. When outside power is restored, a process timer is connected into the circuit with a cycle adjustable up to 30 minutes. At the end of the timer-operated cycle, the load is reconnected to the outside power with a current interruption of about 10 milliseconds.

If outside power fails during this cycle and is restored again, the timer automatically resets to its full duration. After load is transferred to outside power, the engine cools off for five minutes before shutting down and resetting automatically for the next start.



*Control panels and standby generator sets (behind them) are tested before being shipped to site. Control panel contains all contactors, relays, etc., that are needed to start and stop the unit when given the necessary impulse from an external source.*

### Units in Stations Not Using Outside Power

In installations where two RACO sets are the only source of power, one carries the load, the other is a standby. After 71¾ hours, a synchronous-driven timer starts the second unit and after a 15-min warm-up, a quick changeover is instigated. The break is adjustable between 3 and 25 milliseconds. After each changeover, the relieved set runs for a cooling period of five minutes.

### Control Panel

Each RACO control panel has a 2-position switch. In the 'auto' position the set is controlled by the timer panel or the changeover panel. In the 'local' position the set may be handcranked or controlled by stop and start switches on the cubicle. In this position it is possible to test the set by starting and running it without energizing the main contactor.

A remote starting impulse can be transmitted by radio to start the standby set and make it take over the load.

### Alternators And Engines

Alternators on RACO sets are of the standard Brush square-path type. However, they meet more stringent specifications for voltage regulation, wave form and interference suppression.

Air-cooled diesels are used in all cases. Up to 6 kw, Petter AVA1 or AVA2 models are used. From 7.5 to 63 kw, the Petter McLaren PD or PDV engines are used. Standard sets can be used anywhere from the Poles to the Equator without alteration.

Special features are included on these engines since they may run unattended up to 1000 hours. Grease points are eliminated and grease-packed bearings can operate for this period without repacking. Heavy-duty air, fuel and lube oil filters must be used. In most cases, duplicate filters are provided which permit cleaning of one filter while the other is in operation.

It is also necessary to maintain the lube oil sump level. This is done by a spring-mounted supplementary lube oil tank. As the sump level drops, oil flows from the tank into the sump. The tank becomes lighter and rises on the springs until oil level in the tank equalizes with the sump level.

On the smaller Petter AVA types, the alternator incorporates a starting winding. On all the PD models, a separate electric starter motor is used.

### Continuity Unit

In cases where it is so vital that power is not interrupted even for the 3 milliseconds required to transfer the load to a RACO standby set, a continuity unit is used. This consists of an induction, low-slip motor, a heavy flywheel and an alternator on a common base.

Power from the prime source drives the motor which in turn drives the alternator through the flywheel. When power driving the motor fails, inertia of the heavy flywheel is sufficient to drive the alternator at full load and maintain frequency and voltage within close limits for 10 seconds. This is more than ample time to get the standby on the line and restore power to the motor.

Generally, only a small portion of the load is so essential that it cannot tolerate an interruption. To reduce costs, in such cases, a 2-kw continuity unit may be used with, say, a 10-kw diesel set.

If the continuity unit voltage or frequency varies beyond a predetermined limit, the load is automatically transferred to the prime source. To service a continuity unit, it is synchronized with a standby unit, its load transferred and the continuity unit shut down.

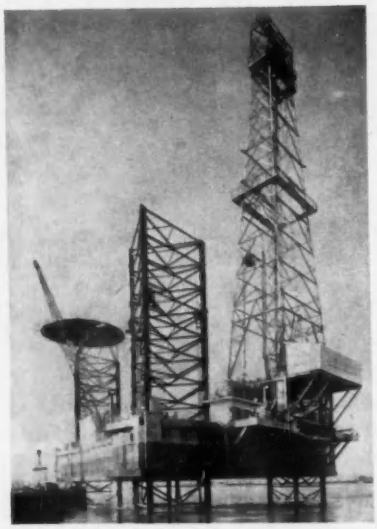
In some installations the continuity unit must carry the entire load. In this case, the unit consists of a motor, heavy flywheel and an alternator connected to the standby diesel through a magnetic or centrifugal clutch. If prime power to the motor fails, flywheel inertia keeps the alternator running until the diesel starts and drives the alternator through the clutch.

### Energy Storage Systems

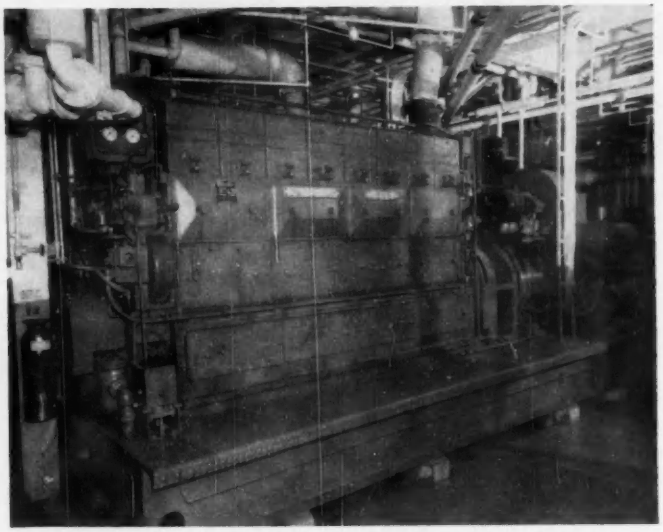
With all the safety precautions inherent in the continuity unit system, there are still cases where vital power lines require an even greater safety factor. An alternative non-interruptable system has been engineered for two such telecommunication links in Canada. In these systems, power from the prime source is fed to a selenium rectifier with a transistorized voltage control system. This maintains a float charge voltage within + or — 1% under all conditions.

The rectifier powers a d-c/a-c rotary invertor which is the permanent source of a-c supply to the radio equipment. A 60-cell lead calcium battery is floated across the rotary invertor. In the event of complete prolonged failure of prime power, the battery bank motors the rotary invertor on full power for eight hours.

Power stations on these Canadian links operate in temperatures varying from 40 to 95°F. All the stations operate unattended and servicing takes place every two weeks. This period will probably be extended with experience.



*One of three 175-ft legs is seen in center of mobile tripod-type platform. Two-well derrick is at right. Circular deck on top of leg at left is for helicopters.*



*One of three White Superior diesels is seen coupled to and driving through a Westinghouse generator and National Gyrol coupling. It provides mechanical drive for a main mud pump and electric power for motors driving drawworks and independent mud pump.*

# Diesel Drilling Package Combines Electric and Mechanical Drive

**A new mobile offshore drilling platform combines the advantages of mechanical and electric drill rigs. Specially-designed drive compound powered by White Superior diesels does the job.**

DESIRABLE features of both mechanical and electric drill rigs are combined in a new mobile offshore drilling platform. This is accomplished through use of the White Diesel Engine Division's electric drilling package.

The platform, called the "Julie Ann", is designed to operate in over 100-ft of water and drill to depths over 25,000 ft. It can drill six holes from a single location. The unit, built by R. G. LeTourneau, Inc., is of a tripod design. It is supported on three 175-ft legs which can be raised or lowered at the rate of a foot per minute.

## Operational Equipment

Drilling is done with a National Supply Type 1625-DE rig using two G-1000-B mud pumps. A National C-350 mud pump is provided for mud mixing and auxiliary purposes.

A specially-designed drive compound, located on the main machinery deck, combines the advantages of mechanical and electrical operations. Each of three White Superior Model PTDS-8, 834-hp, 900-rpm diesels is coupled to and drives through a 500-kw Westinghouse generator and a Gyrol fluid coupling.

The generators power the 350-hp, d-c Westinghouse motor that drives the independent mud pump and the two 1250-hp d-c motors driving the drawworks. The fluid couplings are connected to the generator stubshafts and deliver power from the engines through a compound to the pair of 1000-hp mud pumps.

By remote control of engine speed, a driller can produce as much or as little mud as he desires. While drilling, total output from one generator meets the electric load regardless of operating speed. In hoisting, the full output from each of the three generators is available to the drawworks since the 1000-hp mud pumps can be isolated by dumping the oil from the Gyrol. The third mud pump can be disconnected and power from all the generators will then be available to meet the demand at the drawworks.

Power controls are included on a panel mounted with the conventional rig console stand. Control of the circuits, circuit alarm system and master switches are all conveniently mounted. A White-designed "Variac" is the master power control. It is operated by hand or foot for easy adjustment of power to the load.

General service power is furnished by three Caterpillar D-397 diesel engines directly coupled to LeTourneau 600-60-12 a-c generators. Anchor winches and two 300-ft ton revolving deck cranes are powered by these generators with controls located at the point of application.

**MACK**—one of the leading engine manufacturers using Perfect Circle piston rings for both original equipment and replacement service.

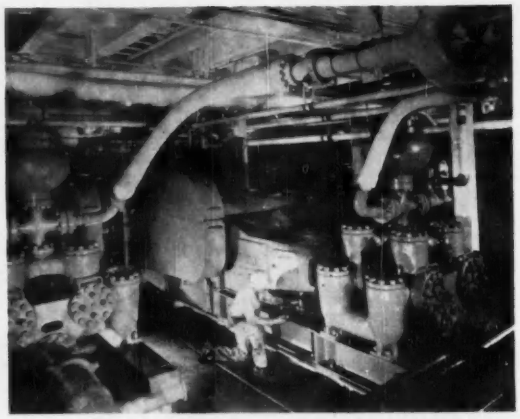
Year after year, Perfect Circle has been privileged to take an active part in the development of the wonderful power plants that are today's diesel engines.

Leading diesel manufacturers use as original equipment and recommend for replacement service piston rings developed in cooperation with Perfect Circle engineers, because these rings are designed specifically for diesel duty.

When you specify rings made by Perfect Circle, you are specifying a proved product backed by 50 years of research, precision manufacturing and engineering leadership.

Perfect Circle Corporation, Hagerstown, Ind.; The Perfect Circle Co., Ltd., 888 Don Mills Road, Don Mills, Ontario, Canada.

**PERFECT CIRCLE PISTON RINGS**



*Crew member is working on one of the two National Supply Type G-1000-B mud pumps. These pumps are mechanically driven.*

Drilling of one to six holes from one spot was a specific demand of the Dixilyn Drilling Corp. of New Orleans, owners of the "Julie Ann." The main deck of the platform contains a massive pair of tracks to skid the entire drawworks and derrick to the drilling position. As a result, the bit can be moved over a 7½-ft by 10 ft area at the direction of the tool pusher. This allows good hole separation and directional drilling accomplishes the spread desired in the pay zone.

**Platform Data**

The hull is 193-ft long, 151-ft 9-in. wide, and 20-ft deep. When afloat, it has a draft of 11-ft 6-in. fully loaded, or of 14-ft fully loaded with appendages. Displacement is 2500 tons.

Living quarters on the main deck, with year-round temperature control, accommodate 45 men. A modern kitchen, laundry and recreational lounge are included.

Tanks inside the hull provide storage space for 5000 barrels of drilling water, 1000 barrels of diesel fuel and 1000 barrels of drinking water. Other storage space on the main deck holds 1500 barrels of active mud, 10,000 sacks of dry mud and 1700 sacks of bulk cement.

Special equipment includes a Schlumberger logging unit, a Halliburton dual T-10 a-c cementing unit, a Swaco desander and degasser, a mud laboratory, and a Cleaver-Brooks Model S300WH2 waste heat salt water evaporator.

**Conclusion**

Pleased with the operation and performance of Superior's "Super PTD-8's on their other rigs with mechanical equipment, Dixilyn Drilling Corp. selected the identical engines for their diesel-electric arrangement. Experience has proven that these engines are easy to maintain and simple to operate. Plus this, their personnel can be switched from one rig to another since the engines are the same. This is especially desirable for many drilling contractors owning several rigs.

# Bigger Quarry Equipment Boosts Output—Cuts Costs

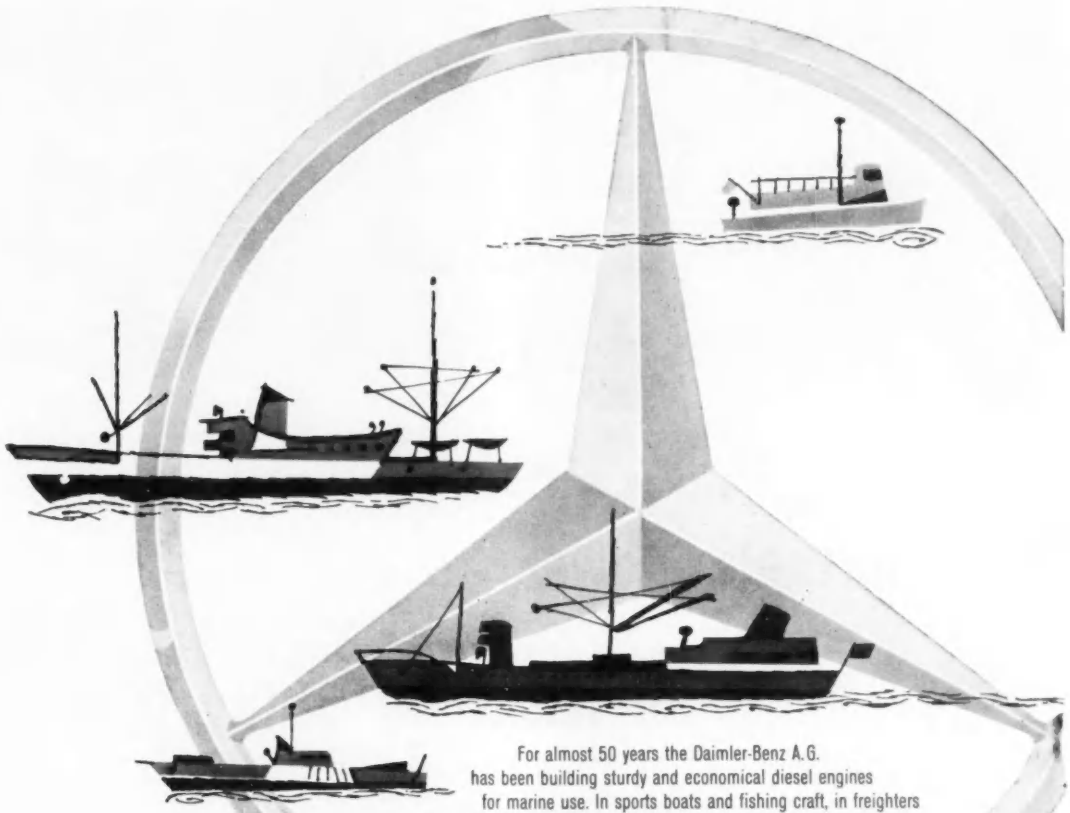
HOW do you get greater production and lower operating costs? That's the problem bothering people in the aggregate industry — whether they're large or small operators.

Material Service Corp. of Chicago successfully turned to heavier trucks and equipment to find its solution to this problem. The result was that per-man-hour production was increased 30% from 1954 to 1957. This increase was accomplished at their Thornton, Ill., quarry when they switched from rail to diesel trucks and increased the size of their crusher.

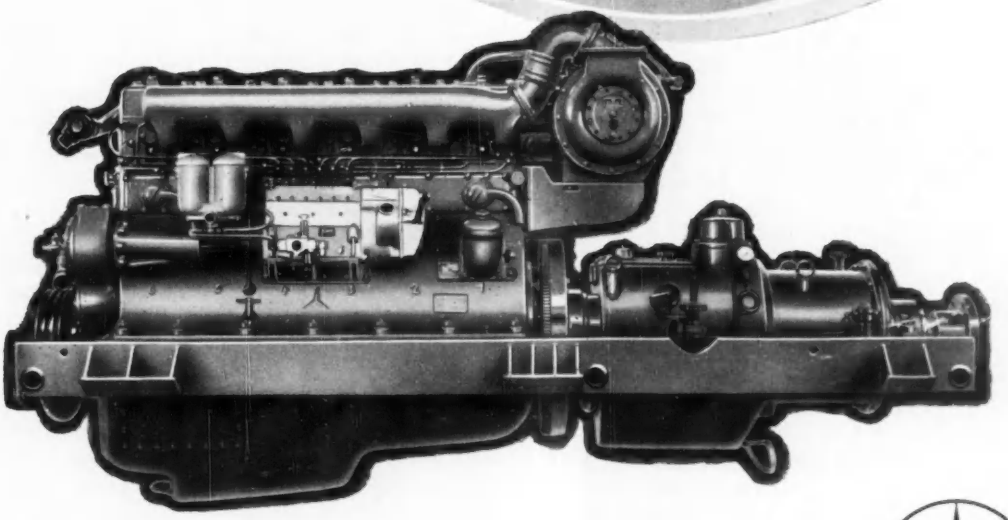
The larger equipment and truck mobility gave greater production per hour with the same manpower — thus reducing costs.

Material Service's emphasis on bigger equipment to achieve greater production is illustrated by another recent purchase at Thornton. Management shifted 12, 27-ton trucks from quarry work to fill-hauling service and replaced them with eight Cummins NVH-12 diesel-powered Darts. The result — instead of carrying 27 tons from quarry to crusher, the Darts transport 50 tons. In other words, eight trucks move the same tonnage as 12 did previously. This change to larger equipment has resulted in an overall increase from 1800 tons to 2000 tons per hour.

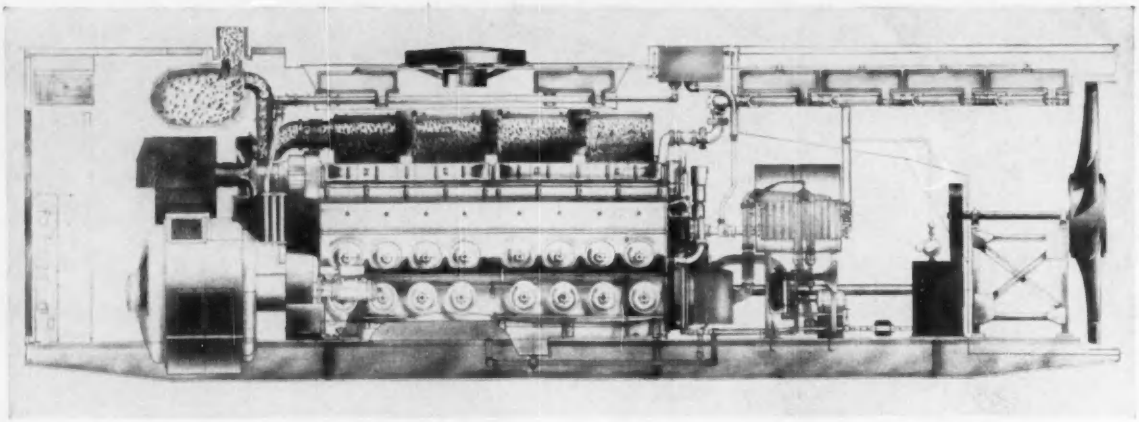
Material Service's overall operation includes 31 yards and plants serving Chicago industry. About 130 Cummins diesels are used in their equipment. The company is noted for its scientific control in the producing of Redi-Mix concrete as well as high quality stone production. They have supplied contractors and builders with scientifically-prepared Redi-Mix concrete, limestone, sand, gravel, and light-weight aggregate for almost 40 years.



For almost 50 years the Daimler-Benz A.G.
has been building sturdy and economical diesel engines
for marine use. In sports boats and fishing craft, in freighters
and tankers, Mercedes-Benz diesel engines are a dependable source
of driving power and of electrical current on board.
For further information please contact
Daimler-Benz A.G., Stuttgart, Germany.



**MERCEDES-BENZ**



*Sideview drawing of one of the three 2000-kw EMD transportable peaking plants shows the arrangement of all the components.*

# Transportable Power - An Asset To Utility Operation

**Peaking — Outages — Distribution problems. All can be handled rapidly, effectively and at minimum capital cost with today's mobile and transportable turn-key diesel power plants. Here are some details of EMD's new 6000-kw power package.**

TODAY'S living conditions and industrial operations make unusual demands on power supply. High power demands for only small parts of the day or certain days of the week must be met in both old and new areas. Meeting these part-time demands by costly additions to central station capacity, increasing capacity of long power lines and sub-station equipment is uneconomical.

A transportable peaking plant can solve the problem quicker and less expensively. Generally it can be installed for less than half the cost of central station enlargement. It is set in, or close to the area where the unusual demand exists. This provides a saving on the first cost of equipment, eliminates heavier, long transmission lines and sub-stations and avoids line current losses. An added advantage is that the plants can also operate as stand-bys for use in emergencies.

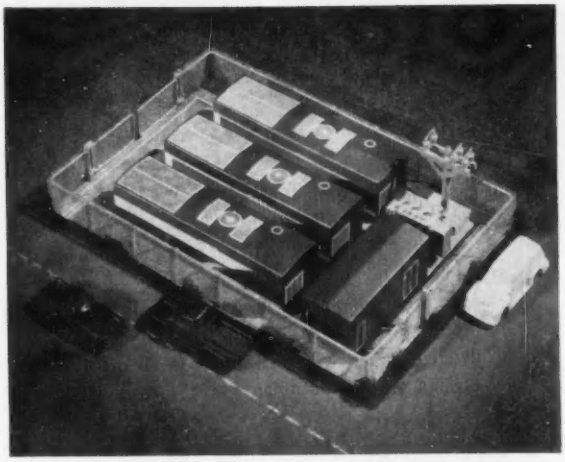
These benefits are further emphasized by a new-design 6000-kw transportable diesel-powered peaking and reserve plant made by the Electro-Motive Div. of GM. The design has been developed out of EMD's experience in making and observing 180 of their 500-kw and 1000-kw mobile power units in the last three years. It is also backed by its quarter of a century of experience in building diesel-electric locomotives, mobile power plants themselves.

The new peaking plant consists of three 2000-kw generating units. Each is in its own steel, weather-proofed, sound-deadened housing. A control unit has similar all-weather housing.

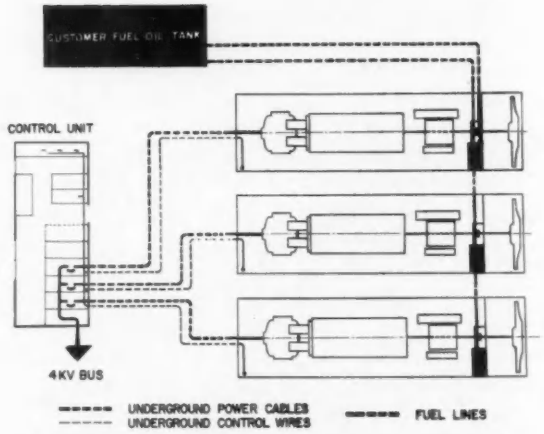
Each unit is so complete, that it is only necessary for the utility to provide a stone and railroad tie or concrete base, couple the cabling and provide a fuel tank. The entire plant with transformers covers a lot no larger than that needed for a small house. Its sound level is said to be very low, assuring that it will be a "good neighbor".

Each 2000-kw unit weighs about 50 tons, the control unit about 17 tons. Each can be shipped on a standard 40-ft flat car and transferred to a low-boy trailer for hauling to the installation site.

The plant can be put on the line, with all three generators fully loaded and synchronized, within 90 seconds. Its controls have many system operation and flexibility advantages due to the wide choice of control methods. With addition of voltage- or current-sensing equipment, the plant can be brought into operation automatically. It can



*Scale model of the 6000-kw EMD peaking plant shows the arrangement of each of the three 2000-kw units. The control units and transformers are located at right. The space taken up by the entire plant is no larger than that needed for a small house.*

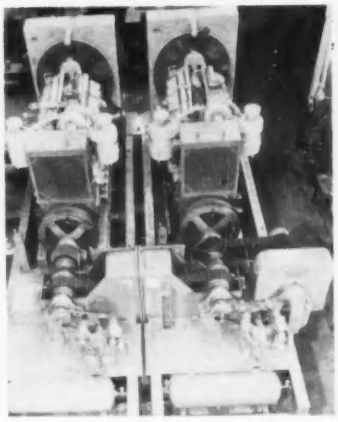



*General layout of the peaking plant shows electrical and fuel connections for field installation. The plant is so completely assembled and equipped at the factory, that all a utility must do is provide a base, set equipment and lay ground cables.*

be operated by time clock starting and stopping, also from a central dispatching station or by a combination of starting methods. Whatever method is used, no attendance is required.

EMD's ability to deliver these units within four to six months makes it possible to match load growth as it occurs. This makes it possible to postpone installation of expensive facilities and chart needs more accurately, while providing for peak load growth at a lower investment.

EMD has also extended its unit exchange program, (in effect for its railroad customers for many years), to cover these plants. This program provides for quick replacement of any major component up to and including a whole 2000-kw power unit. EMD will also work out a basic contract covering scheduled servicing of these units for any utility which buys the new plants.



## Equipment Interchangeability Cuts Downtime

AN unusual amount of interchangeability is featured in drive sections made by National Supply Company for drilling equipment. This is very desirable, especially in rugged terrain where delivery of supplies is difficult. This unusual degree of interchangeability is a protection against excessive downtime in case of trouble with any of the drive sections.

The equipment includes a 2-section drive group for a National Type 50 draw works, a 2-section drive group for a National Type G-700 slush pump, a single-section independent pump drive, and a standby engine unit. No. 1 sections of 2-section drives are interchangeable as complete units with each other and with the standby engine unit.

Each engine unit consists of a Caterpillar D-397 mounted on a skid with a National B-275-80 FC torque converter. The engine end of the frame of each drive unit is made with transverse beams below floorplate level. The frame serves as a cradle for any of the six identical engine skids. In case of trouble with any drive group engines, it can be removed by loosening just a few bolts and substituting the standby engine.

The sections are pre-aligned at the factory so they can be interchanged without disrupting operation. Shaft assemblies for each of the five drive sections are identical, including Airflex engine clutches, sprockets, bearings and housings, and air compressor drives. Compound chain enclosures of the No. 1 sections are flanged on the open end to mate perfectly with No. 2 sections. Each section carries its own air compressor, drive, and air receiver tank, so that substitution of sections or of shaft assemblies requires no changes in the air supply system.

***A leading engine builder tells what causes crankshaft breakage and if it happens to you what can be done to avoid repetition once you can . . . . .***

# Recognize Types of Crankshaft Failures

WHEN a crankshaft fails, find out why or it may happen again. As to what should be checked and why — here's a review of the comments and recommendations made by the Detroit Diesel Div. of General Motors Corp. based on their experiences with the Series 71 and 110 diesels.

There are two distinct types of crankshaft failures:

(1) Bending fatigue failures result from bending of the crankshaft. This takes place once every revolution.

(2) Torsional fatigue failures result from torsional vibration. This takes place at high frequency usually equal to the number of cylinders times the rpm.

### Bending Failures

A burned out main bearing or a broken or loose cap puts an abnormal bending stress in the crankshaft, particularly in the crank cheek. This may not be noticed. Generally, failure of a main bearing does not immediately cause any unusual noise or give any sign except for a drop in oil pressure.

Failures from bending occur in the crank cheek. They're identified by a series of fracture lines at right angles to the crankshaft. These lines are not necessarily straight. Sometimes they are partly obliterated when the engine runs after the crankshaft is broken.

If main bearings are replaced due to failure, the crankshaft must be magnafluxed for cracks. These cracks will occur most likely in the first or second crank throw on either side of the damaged main bearing.

### Torsional Failures

Crankshaft working stress is increased by torsional vibration. Continued excessive torsional vibration eventually breaks the crankshaft.

The general causes of torsional fractures are: (1) Loose vibration dampers. (2) Adding pulleys or couplings on the front end of the crankshaft. (3) Loose flywheels. Torsional fractures due to loose flywheels invariably occur near the flywheel end of the crankshaft away from the damper. They don't occur in the vicinity of number one cylinder.

Torsional stresses may fracture either the crank pin or crank cheek. Crank pin failures usually occur through the oil hole at a 45 deg angle with the axis. Torsional fractures of the crank cheek are identified by short parallel lines running approximately parallel with the crankshaft. Fractures caused by bending are at right angles to the crankshaft.

To limit amplitude of torsional vibration, a damper or balancer is fitted to the front end of the crankshaft on certain applications. This is calibrated to suit the particular model, depending on the number of cylinders and maximum engine rpm.

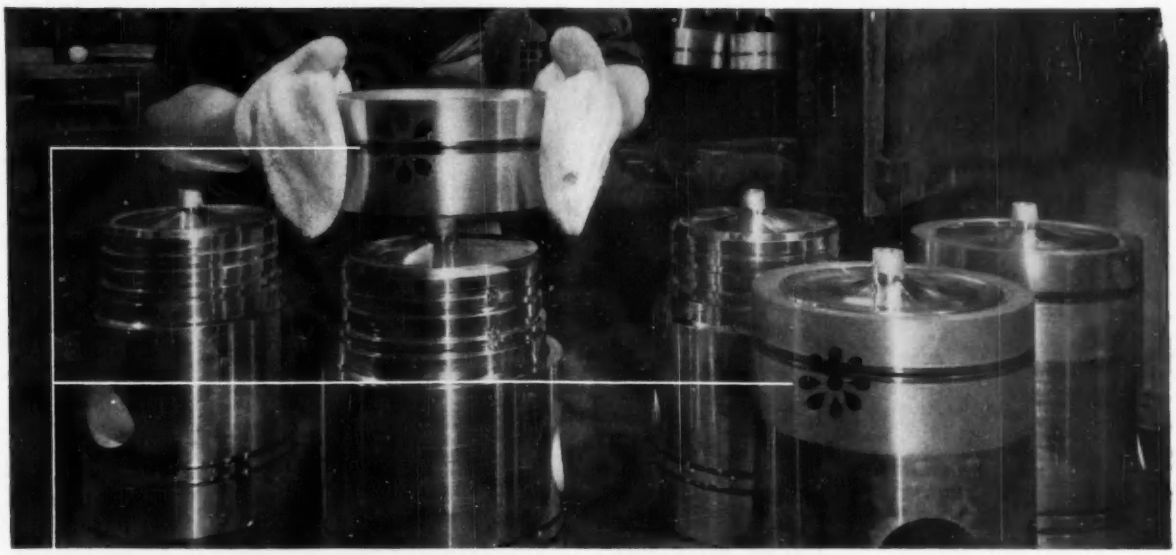
The harmonic balancer used prior to World War II on GM 71 engines should be inspected periodically to see if it is working properly. All five spring packs should be solid and intact. The rubber bonding must be secure and not deteriorated.

If the shell of a viscous-type damper is damaged and fluid escapes, the damper must be replaced. Internal clearances of the inertia ring and casing are close. Prying, pounding or other abuse may cause the ring to bind and ruin the effectiveness of the damper. Treat them with care. Since construction of this type damper does not permit internal inspection, it should be renewed when the engine is overhauled or every 4000-hr of operation, whichever occurs first.

The retaining bolt in front of the crankshaft must hold the damper securely in place at all times. Never bar the engine over opposite to the bolt-tightening direction when using this retaining bolt. You may loosen it resulting in damage to the damper.

### Conclusion

When investigating a crankshaft failure, a thorough search for contributing factors must be made. Defective material may cause a failure but these cases are very infrequent and usually the defect is plainly exposed at the fractures. A full examination should be made first to determine if the cause is outside the crankshaft.



**"Bonded-In" Ni-Resist Forms Top Ring Grooves.** Because the thermal expansion of Ni-Resist matches that of aluminum, Ni-Resist inserts can be permanently bonded in. Bonding is by Al-Fin Process, developed by Fairchild Engine and Airplane Corp., Deer Park, L. I., N. Y.

**Most Powerful Harbor Tug in the United States.** Squat, pug-nosed Kings Point is powered by a 2100 HP ALCO diesel with forged aluminum pistons. All 16 pistons are equipped with Ni-Resist inserts at the top compression ring groove. The Kings Point operates out of Baltimore for the Curtis Bay Towing Company, Baltimore, Md.

# Ni-Resist ring carriers keep her powerful new diesel powerful longer

Once ring grooves lose their shape, through wear, galling and heat, down goes compression, power and efficiency. To strengthen this critical point, pistons on the Kings Point's engine are protected with Ni-Resist* nickel cast iron in the top ring groove area.

*Ni-Resist* ring carrier inserts hold their shape longer, and keep this powerful diesel powerful.*

Ni-Resist iron effectively resists wear, corrosion at diesel operating temperatures. Ni-Resist inserts remain tight in piston service.

Ni-Resist ring carrier inserts, cylinder liners, valve guides, and exhaust manifolds can reduce your maintenance problems. Fill out the coupon on the right if you want to know how Ni-Resist can extend the life of your diesel equipment.

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Gentlemen:
Please send me "Keep 'Em Rolling" and "Engineering Properties and Applications of Ni-Resist."

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# Curtiss-Wright Adds Four Mercedes-Benz Models

***Both low and high horsepower models were selected to round out the range of engines available through Curtiss-Wright.***

FOUR more Mercedes-Benz diesels have come to the U. S. These newcomers are the Models MB 820Bb rated 625-1025 hp and MB 836Bb, rated 325-525 hp, both at 1000-1500 rpm and Models MB 846Ab rated 175-320 hp and MB 846A rated 130-240 hp at 750-1500 rpm. The four models, now available through The Utica Div., Curtiss-Wright Corp., have many features in common.

Each uses wet liners. Each has individual cylinder heads. However, the MB 820Bb and MB 836Bb heads have two intake and two exhaust valves while heads for the other two models use one of each. The cylinder block, pistons and oil pan are made of aluminum alloy in the MB 820Bb and MB 836Bb. In the MB 846Ab and MB 846A, the pistons and oil pan are also made of aluminum alloy, but the clinder block is of a special grade of cast iron. All models are available either with heat exchangers or radiators for cooling.

Combustion and fuel injection systems are also alike. All use the Daimler-Benz precombustion chamber and Robert Bosch injection pumps and nozzles. All but the Model MB 846A are turbocharged by Brown-Boveri turbochargers. This unit is normally aspirated.

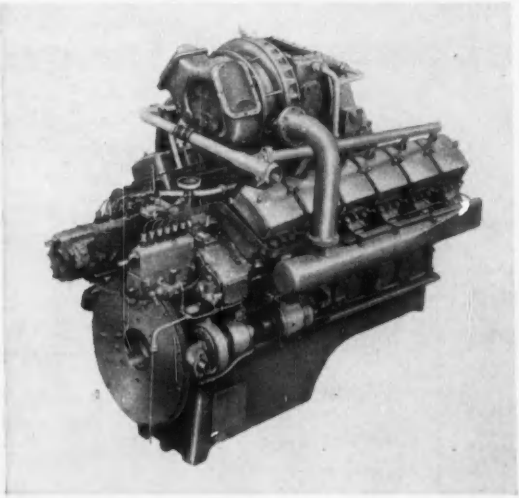
Glow plugs are provided to give fast starting in very cold weather. Either a 24-v electric system or air motor is available for starting.

The MB 820Bb is a 12-cyl, vee-type, unit weighing 6116 lb. It has two connecting rods side-by-side on each crankthrow of the crankshaft. The MB 836Bb is a 6-cyl, vertical, in-line unit weighing 4830 lb. However, both are 4-cycle engines with a 6.875-in. bore and 8.063-in. stroke and a compression ratio of 16 to 1.

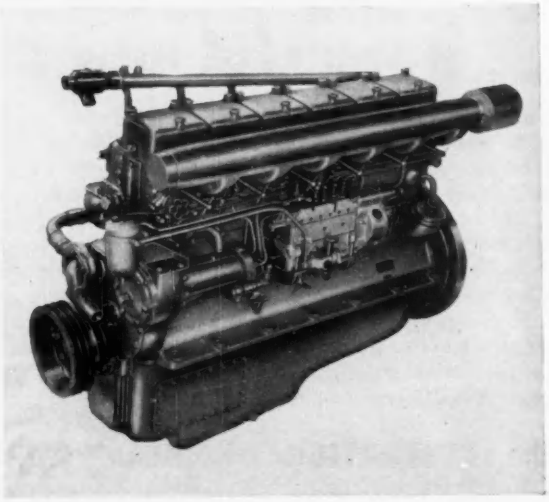
Overall dimensions for the larger of these two engines are: length, 94½-in., width, 53-in. and height, 77-in. The smaller unit is 84-in. long, 41-in. wide and 64-in. high.

The MB 846Ab and MB 846A Models are 6-cyl, 4-cycle

*Model MB 820Bb, 12-cyl, vee-type, Mercedes-Benz diesel is rated 625-1025 hp at 1000-1500 rpm. Note Brown-Boveri turbocharger located on top of engine. Each of the Robert Bosch injection pumps (left) serves one bank of cylinders.*



*Model MB 846A, 6-cyl, Mercedes-Benz diesel is rated 130-240 hp at 750-1500 rpm. This is the only one of the four newly imported models that is not turbocharged. This 5.875-in. by 7.5-in. bore and stroke unit has a compression ratio of 18.5 to 1.*

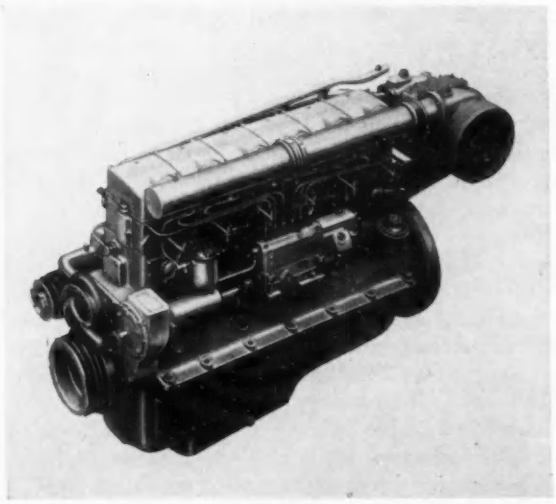


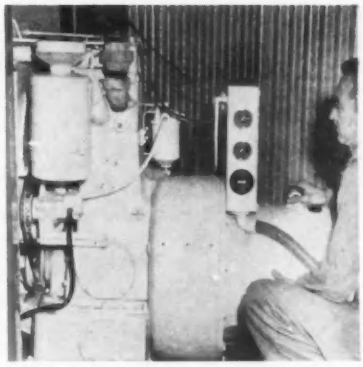
*Model MB 836Bb is also a 6-cyl diesel. However its bore and stroke is 6.875-in. by 8.063-in. and has a 16 to 1 compression ratio. It is rated 325-525 hp at 1000-1500 rpm. Its turbocharger can be seen at the upper left end of the engine.*

vertical, in-line units, each with a bore and stroke of 5.875-in. by 7.5-in. Compression ratio of the MB 846Ab is 17 to 1 while that for the MB 846A is 18.5 to 1. Dimensions for the former are: length, 83-in., width, 35-in. and height, 58-in. It weighs 4298 lb. The latter weighs 4075 lb and is 91-in. long, 59-in. high, and 32-in. wide.

All models are designed for use in: drilling rigs; generator sets; ship propulsion; marine auxiliaries; construction, mining and logging machinery; pumps; compressors; and other applications.

*Model MB 846Ab, another 6-cyl unit, is also turbocharged. With a bore and stroke the same as that of the MB 846A, it is rated 175-320 hp at 750-1500 rpm. It has a compression ratio of 17 to 1. Its turbocharger is located at the right end of the engine.*





## Diesel Standby Makes Wind-Driven Generator Practical—Cuts Costs

A WIND-driven electrical power package for isolated areas is Automatic Power Incorporated's latest. It consist of a 6-kw wind generator, a battery bank and a standby diesel generator set. The complete package offered by this Houston, Texas, outfit, including a Nordberg Power Chief diesel generator set, is fully automatic. It is designed to operate unattended for 4 to 6 months.

At present, over sixty such installations are in operation throughout the world. They supply power for: radio relay stations; remote farms; small housing estates; pumping plants; etc.

High efficiency blade design permits electrical power generation at wind velocities as low as 6 mph. Maximum continuous output of 6 kw is obtained at a wind velocity of 20 mph. Hydraulic pitch control of the 33-ft propeller blades assures constant generator speed at varying wind velocities. These blades turn at 86 rpm and are connected to the generator through speed increasing gears.

The complete plant, mounted on a 33-ft steel tower, can withstand wind velocities over 100 mph. A special storm-stop automatically feathers the blades when wind velocity exceeds 45 mph.

During long periods of low wind velocity, load is carried by a bank of 250 amphs, 110-v Gould batteries. At a predetermined point of discharge, the stand-by 1-cyl, 4-cycle, 1200-rpm Nordberg diesel d-c generator set automatically starts and recharges the battery. Average installations require operation of the diesel generator less than 10% of the time. Maintenance for the entire package is said to be reduced to one-fourth that required for an equivalent diesel plant operating on full-time basis.

# Re-ring Properly

**For best performance when replacing piston rings you should consider: (1) Selection; (2) Inspection; (3) Procedures; (4) and even records. Here are ideas on how to do a better job.**

YOUR rings won't last if pistons and liners aren't in good condition. So, when installing new rings in a diesel, you've got to know the condition of these pistons and liners. You must decide if they can be reused "as is", or if they must be reconditioned or replaced.

The Piston Ring & Seal Dept. of the Metal Products Div. of Koppers Co., Inc., gives many excellent recommendations on this subject. These recommendations not only help you in making the right decisions but also help you get better engine performance through proper ring installation. Here they are.

### When Checking Pistons

1. Clean all pistons thoroughly. Be sure to remove all carbon from the ring grooves.

2. Inspect all pistons for cracks, broken lands, excessive scoring, or any defects requiring piston replacement. This inspection for cracks should not be merely visual. It should preferably be done by one of the following methods: penetrating dyes, such as Dycheck; magnetic particle inspection, such as Magnaflux or Magnaglo; or fluorescent penetrant inspection, such as Zyglo.

3. Check grooves for taper and shoulders. A new ring can't seat properly or form a satisfactory seal in a badly worn groove. (See Fig. 1) Regroove all badly worn grooves and obtain over-width rings for them. The permissible limit for acceptable groove wear will vary with the type of piston, service, and operating conditions. The manufacturer's specifications should always be used, however in their absence, the following are offered as a guide for normal usage:

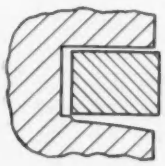


*Fig. 1. A new ring in a worn groove would not seat properly. The results would be blowby past the ring with all its ill effects and possible groove and ring breakage.*

| *Cylinder Diameter* | *Groove Wear* |
|---|---|
| up to 4-in. | 0.002-in. |
| 4-in. to 8-in. | 0.003-in. |
| 8-in. to 12-in. | 0.004-in. |
| over 12-in. | 0.005-in. |

4. Check side clearance for new rings in piston grooves. (See dimension A, Fig. 2) For proper clearance, use engine builder's specs. If these are not available, Tables A and B give general recommendations.

5. Check piston groove depth for sufficient back clearance. This may be done with a depth gauge. Note any radius in the back of a groove since this must be taken into account when ordering or fitting new rings. If new rings are on hand, one may be rolled around in the piston groove for which it is intended, with the outside of the ring touching the back of the groove. Groove depth is sufficient if the wall of the ring does not project outward beyond the outside of the piston. (See dimension B, Fig. 2.)

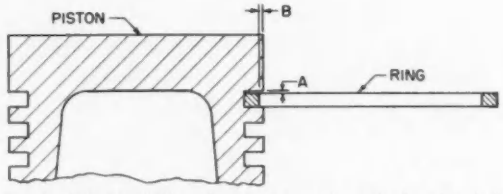
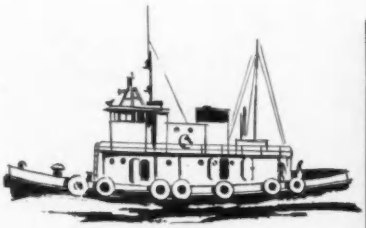



*Fig. 2. Before installing rings on the piston, check point "A" for side clearance and "B" to make sure that the groove depth is enough to prevent the ring from projecting beyond piston.*

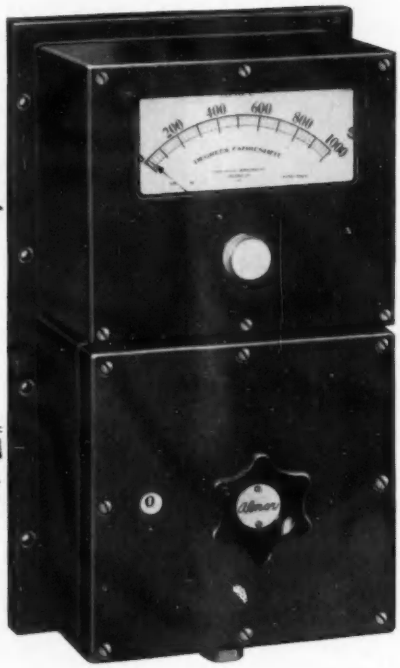
### Checking Cylinders

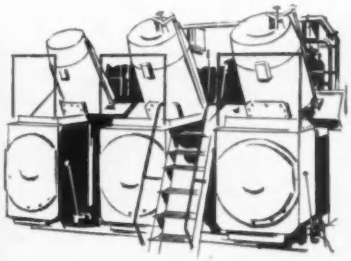
Cylinders should be checked for finish and for wear (See Diesel Power, April, 1958). Badly scuffed or scored cylinders should be rebored, honed, or replaced. A highly glazed cylinder should be lightly honed or rubbed with emery cloth until the glaze is sufficiently broken to permit satisfactory seating of the rings. Also remove the wear ridge at the end of ring travel. After the glaze has been broken, the cylinders should be cleaned thoroughly, (washing with soap and water is good) and then oiled with engine oil.

Replacement rings of various types can compensate for a limited amount of cylinder wear. As a general rule, the maximum oversize limit for cylinder wear is approximately 0.003-in. per inch of cylinder diameter. Maximum out-of-roundness should not exceed approximately 0.001-in. per inch of cylinder diameter. However, in individual cases, limits may vary because of variations in engine design and operating conditions.

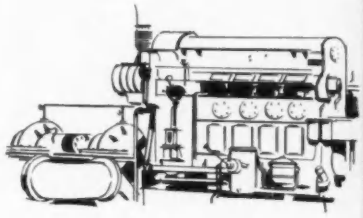


Marine

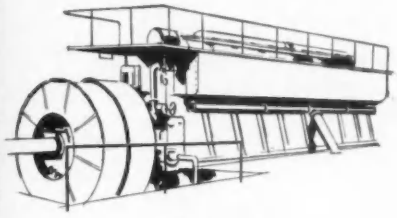


Engine compressor



Pumping



Stationary

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| | | |
|---|---|---|
| CYLINDER OVERLOAD | SCALED JACKETS | DETONATION |
| PREIGNITION | CLOGGED PORTS | FAULTY INJECTION |

Series A Pyrometers are designed specifically for direct mounting on diesel engines or other equipment subject to vibration and rough usage. Readings are accurate to within + or −1%. Dustproof, fumeproof, splashproof. Switch capacities of 4, 6, 8, 10, 12 and 16 circuits. Other models to 31 circuits. Get full information—by return mail. Send for Bulletin 4361 with complete details of the Pyrometer and thermocouple assembly designed for your engine.

*Alnor*

*write:*

**ILLINOIS TESTING LABORATORIES, INC.**

Room 507, 420 No. LaSalle St., Chicago 10, Illinois

TABLE A
2-Cycle Diesel Or Gas Engines

| Cylinder Diameter In Inches | Minimum Side Clearance | | | Minimum End Clearance | | | |
|---|---|---|---|---|---|---|---|
| | Compression | | Oil | Compression | | | Oil |
| | Top | Other | | Step and Straight Cut | 45°Angle Joint | Straight Cut Joint | 45°Angle Joint |
| Below 6 | 0.006 | 0.004 | 0.002 | 0.0045xDia. | 0.003xDia. | 0.003 xDia. | 0.002xDia. |
| 6 to 8-15/16 | 0.008 | 0.006 | 0.0025 | 0.0045xDia. | 0.003xDia. | 0.0025xDia. | 0.002xDia. |
| 9 to 11-15/16 | 0.010 | 0.008 | 0.003 | 0.0045xDia. | 0.003xDia. | 0.0025xDia. | 0.002xDia. |
| 12 and over | 0.012 | 0.010 | 0.0035 | 0.0045.xDia. | 0.003xDia. | 0.0025xDia. | 0.002xDia. |

### Ring Types

Frequently, special types of new rings can largely compensate for some wear on pistons and liners. (See Diesel Power, July, 1957) To determine the ring types for specific conditions and specific types of equipment, get recommendations from a ring or engine manufacturer.

### Installing Rings On The Piston

Whenever possible, a ring tool should be used for installing rings on the piston. If the rings are opened further than necessary, they may be overstressed and become permanently distorted. Consequently they will not conform to the cylinder after installation. After installation on the piston, rings should be lubricated and the joints should be staggered in relation to one another.

To install a Koppers conformable oil ring:

1. Remove the coil spring expander from the ring.
2. Open the coil spring expander by pulling one end free from the joint pin.
3. Lubricate the expander.
4. Place the expander in the proper oil ring groove on the piston and insert the joint pin in the end of the spring.
5. Install the ring, as described in the previous paragraph and locate the ring joint 180-deg from the spring joint.
6. Check the assembled ring to assure freedom in the groove. Check back clearance by pressing the assembled ring against the bottom of the groove. At the point where the pressure is applied, the face of the ring should be below the surface of the piston.

### Installing The Piston And Rings In The Cylinder

Compress the rings with a contracting tool or tapered sleeve and ease the piston into the cylinder. (See Fig. 3) Extra care should be taken with conformable oil rings to avoid edges being damaged and to make sure that rings do not hang up at the entering edge of the cylinder bore.

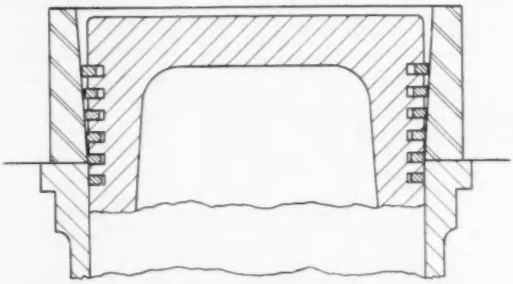


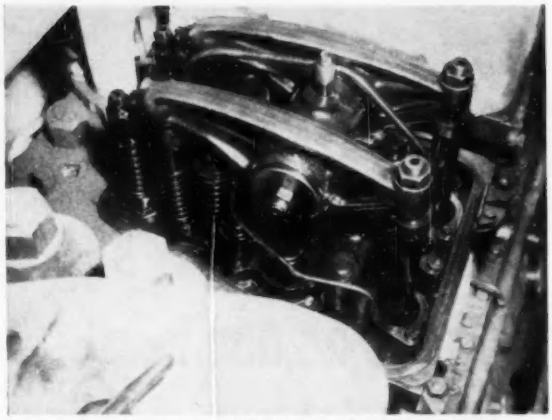
*Fig. 3. When installing piston and rings in a cylinder, compress the rings with a contracting tool or tapered sleeve to keep rings from catching on top of liner.*

### Ring And Cylinder History

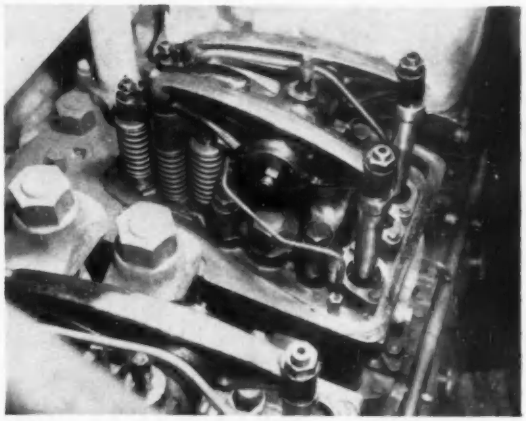
At the time of each installation, a complete record should be made for future reference. This should include date of installation, cylinder measurements, ring types, ring clearances, etc. Piston ring and cylinder service record sheets prepared for this purpose are available from Koppers. These facilitate recording of the data and reduce both the chance of making an error and the time of writing the data.

TABLE B
4-Cycle Diesel Or Gas Engines

| Cylinder Diameter In Inches | Minimum Side Clearance | | | Minimum End Clearance | | | |
|---|---|---|---|---|---|---|---|
| | Compression | | Oil | Compression | | | Oil |
| | Top | Other | | Step and Straight Cut | 45°Angle Joint | Straight Cut Joint | 45°Angle Joint |
| Below 6 | 0.004 | 0.003 | 0.0015 | 0.0045xDia. | 0.003xDia. | 0.003 xDia. | 0.002xDia. |
| 6 to 8-15/16 | 0.006 | 0.005 | 0.002 | 0.0045xDia. | 0.003xDia. | 0.0025xDia. | 0.002xDia. |
| 9 to 11-15/16 | 0.008 | 0.006 | 0.0025 | 0.0045xDia. | 0.003xDia. | 0.0025xDia. | 0.002xDia. |
| 12 and over | 0.010 | 0.008 | 0.003 | 0.0045.xDia. | 0.003xDia. | 0.0025xDia. | 0.002xDia. |



*Rocker arm assembly of a 1600-hp Alco locomotive diesel is seen covered with sludge formed during hundreds of hours of operation.*



*Rocker arm assembly in adjacent photo is shown after it was desludged with a chemical compound without being taken apart.*

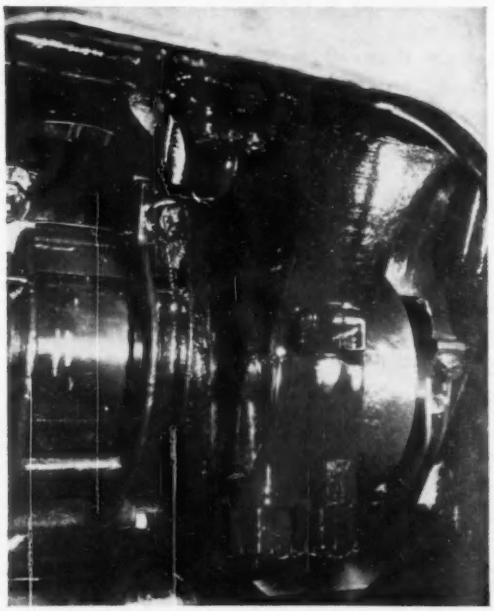
# Diesels Desludged Without Dismantling

**By B. H. Bailey, Jr.**

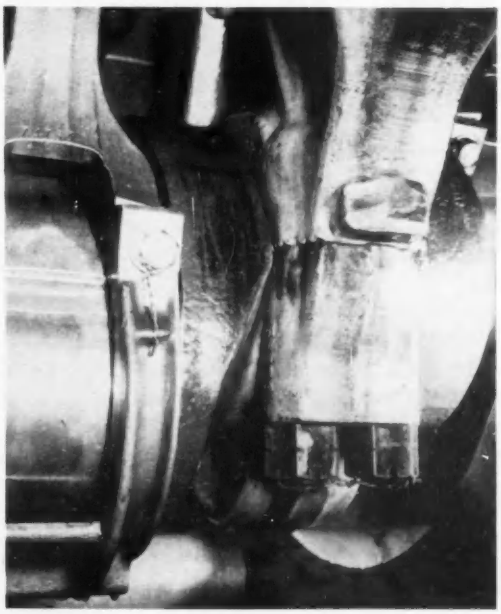
**Assistant Technical Director, Magnus Chemical Co., Inc.**

***Here's how diesels are being internally cleaned and sludge removed without engine disassembly. This desludging process saves time and money. While applied here to locomotive engines, the process has broad application.***

*Parts of conrod, crankshaft and crankcase seen, give an indication of the great amount of sludge that has accumulated on the rest of the internal parts of this engine.*



*Same parts of 1500-hp EMD locomotive diesel in adjacent photo are seen after being cleaned chemically without disassembling the engine. All internal parts are as clean.*



SLUDGE from locomotive diesels can be removed chemically without dismantling the engine. Developed by the Magnus Chemical Co. of Garwood, N. J., this method removes all types of sludge wherever lube oil flows in the engine. Poor heat transfer conditions caused by this sludge are therefore eliminated.

Removal of sludge is complete in oil lines, oil passages and oil coolers which cannot be inspected easily. Use of this method prior to general overhauls makes engine disassembly easier and reduces subsequent cleaning time by at least 50%.

The compound, called Magnus RR-737, is circulated through the engine in place of lube oil and is superior to oil as a lubricant and coolant. It removes all types of sludge without attacking any metal or seals. To date, about 60 locomotive diesels have been desludged successfully using this compound.

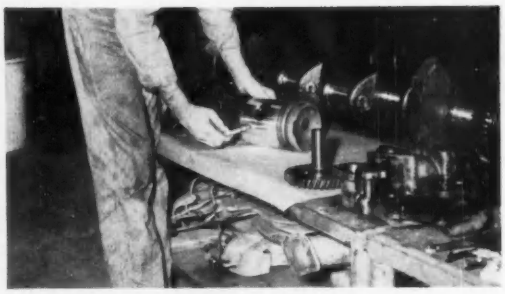
Initial development work on desludging was performed at the Toledo, Peoria & Western Railroad, Peoria, Ill., on Alco, EMD and B-L-H engines

Here's the typical desludging procedure when using this method.

1. Drain oil from crankcase.
2. Remove filters and recap filter compartment. Leave strainer in place.
3. Fill crankcase to normal oil level with Magnus RR-737.
4. Run engine in notch 3 for 1 to 3 hours with transition lever in off position, or with other control devices in no-load position.
5. Drain compound *immediately* after stopping engine.
6. Refill engine to normal oil level with a good grade of flushing oil *immediately* after draining compound. Flushing oil used by the Minnesota Transfer, which has been found to be very satisfactory, has the following characteristics: gravity — 30.5 average; color — 2; flash — 415°F; fire — 465°F; viscosity — 200 SUS @ 100°F; viscosity — 95 SUS @ 130°F; composition — straight mineral oil.
7. Run engine in notch 3 for 20 to 30 minutes.
8. Drain flushing oil *immediately* after shutting down engine.

Because lube oil flow in the rocker arm area is normally low, perforated copper distribution lines were installed in the top deck connected to the main lube oil line serving this area. This supplied a greater flow of RR-737 than would otherwise be possible. Where such distribution lines have been used, the rocker box area has been completely desludged.

To realize the maximum advantages from desludging, tanking of Magnus RR-737 and flushing oil should be considered. These tanks should be constructed with conical bottoms which serve as settling basins for microscopic particles of carbon suspended in both the compound and the flushing oil. In addition, the use of tanks eliminates the problem of handling drums. Since Magnus RR-737 can usually be re-used at least twice, three desludgings can be performed using the same batch.



# Runs 25,000 Hours — Needs Only Piston Rings

SCHEDULED preventive maintenance has prolonged a Cat diesel's life way beyond that expected. At a large manufacturing plant in South Carolina, a Cat D364, showed so little wear after operating 25,000 hours (equal to 625,000 miles at 25 mph), that parts replacement was limited only to piston rings.

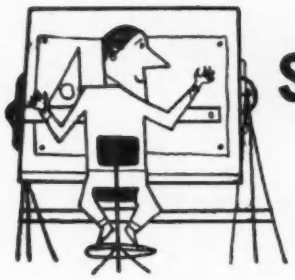
This unit, one of 40 Caterpillar D364's used to generate electricity for experiments at the plant, was installed in 1952. The engines are run in banks of four, each getting one week in four off for servicing. Each engine runs 24 hours per day, three out of four weeks, 12 months a year.

Due to the importance of dependable, continuing operation in the plant's work, engines are always kept in top condition. Regular service schedules supplied by Caterpillar are observed.

The engines approached 25,000 operating hours in November 1957. At this time the plant's equipment maintenance division disassembled one engine to check wear and need for overhaul or replacement of parts. Each part was checked against the original manufacturer's recommended wear limits. Only two piston rings, 0.001-in. out of tolerance, exceeded the limits. Bearings, pistons, liners, shafts and other moving parts were well within recommended wear limits.

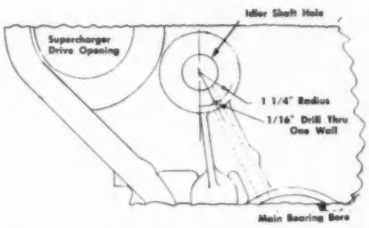
The only other work between installation and disassembly was done at 18,000 hours. Heads on the vee-type engine were cleaned and interchanged to eliminate carbon build-up. At the same time, valve guides were reconditioned.

Because of the low wear at 25,000 hours, the engine was reassembled with a new set of piston rings as the only replacement. The chief supervisor of the plant's equipment maintenance division believes that this engine's outstanding record is due largely to carefully observing service and maintenance recommendations.



# service section

**Recent engine and equipment modifications, procedures and recommendations straight from the different manufacturers to you**




## Idler Gear Ball Bearing Lubrication on Cummins NHS and NHRS Engines

Additional lubrication is being provided for NHS and NHRS idler gear ball bearings by drilling a 1/16-in. hole in the cylinder block.

This new oil hole pressure sprays lubricating oil directly on the idler gear ball bearing which formerly was lubricated by splash from the gear train.

NHS and NHRS engines now in service may be modified by locating and drilling the 1/16-in. hole in the location shown in the sketch. After drilling the hole, flush the connecting oil passages to remove any cuttings.

The oil hole described above is drilled in all NHS and NHRS cylinder blocks beginning with engine serial No. 139270.

## GM Seal Ring Identification

Water hole seal rings and the end water hole seal rings currently being furnished separately, and/or in cylinder head overhaul gasket kits for the Series 71 engines are being manufactured in either a solid white or solid red color.

Functionally, color is unimportant and they are completely interchangeable. Both colors may be included in a gasket kit and they can be mixed when installing in an engine.

## New IH Single-Plunger Pump Data

Here is valuable service data for the IH single-plunger fuel injection pump 270 030 R91 used on the TD-6 (61 series)—450-0 Mine Tractor with 12-v direct starting. This pump uses primary pump 278 235 R91 with by-pass valve to permit bleeding the final filter since this is a direct-starting diesel engine.

For the injection pump and primary pump parts list, refer to injection pump parts catalog PU-40A.

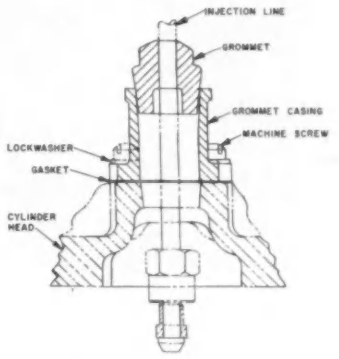
*Torque control adjustment and flow data for pump* 270 030 *R*91

| | |
|---|---|
| Identification No. | TD-6 (61) 450-O Mine Tractor |
| Engine Model | D-281 |
| Normal Gov. Engine rpm and Speed Reg. % | 1650-9% |
| Inj. Pump No. | 270 030 R91 |
| Gov. Spring No. | 276 465 R91 |

| | |
|---|---|
| Aver. Del. in c.c. at 550 rpm for 550 Rev. | 53 |
| Max. Perm. Var. of any nozzle from Aver. Del. | ± 3 |
| Torque Control Adjustments | |
| 1. Torque lever stop sc. | 7/16-in. |
| 2. Torque Spring shoe sc. | 5/8 ± 1/32-in. |
| 3. Overload gap | 0.045 ± 0.020-in. |
| 4. High Idle gap | 0.080 ± 0.005-in. |

When servicing filters or opening lines for any reason, air gets into the fuel system. It is then necessary to bleed air from the system before attempting to start the engine. This is done by opening the bleeder valves on top of the auxiliary and final filters, and the by-pass valve on the primary pump housing cover.

Gravity fills fuel lines and filters and forces air to escape. Close bleeder valves, and the by-pass valve on the primary pump because it's function is to allow fuel to by-pass the primary pump gears.



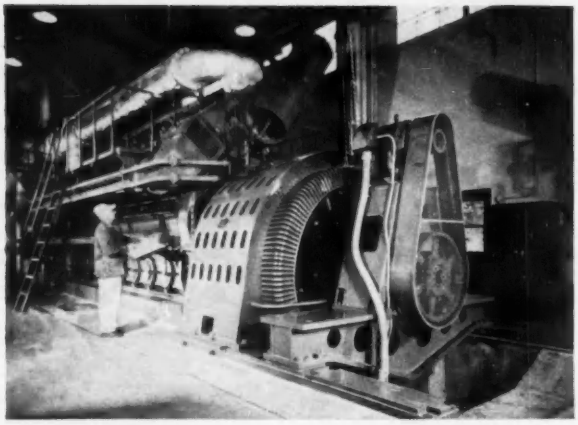

## Optional Injector Tube Grommet Assembly Kit for Alco 244 Engines

Alco now offers customers with Model 244 engines an optional injection tube grommet assembly kit. It has been designed to prevent leakage of lube oil through the injection line openings in the cylinder heads in those few instances where such leakage has occurred. The new kit, catalog 25000222, is stocked in Alco warehouses.

The individual pieces for this kit, indicated in the sectional view are as follows:

| *Nomenclature* | *Cat. No.* |
|---|---|
| Grommet | 21534012 |
| Grommet Casing | 2403011 |
| Machine Screw | 2154012 |
| Lockwasher | 2151312 |
| Gasket | 2153265 |

# industry news



### Diesel Power Editor Gets ASME Award

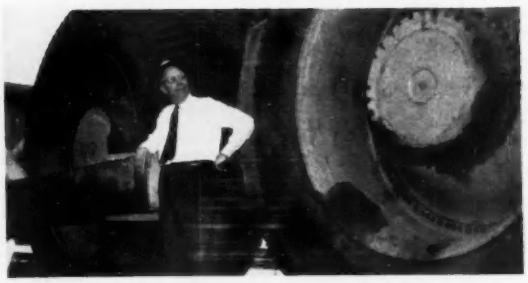
The American Society of Mechanical Engineers recently honored Brian P. Emerson (left, standing), ASME Member and editor of Diesel Power. The occasion was the 30th Annual Conference and Exhibit of the Oil and Gas Power Division, ASME, in Philadelphia. Presentation of the award was made by J. N. Landis, President of ASME (right). In foreground, seated, is Rear Admiral A. G. Mumma, Chief, Bureau of Ships, U. S. Navy. Professor L. L. Otto, chairman of OGP Honors and Awards Committee is in background.

The certificate presented read in part " . . . in testimony of the high regard of his co-workers and the deep appreciation of the Society for his valued services in advancing the Engineering Profession as Secretary, Oil and Gas Power Division, Executive Committee." Mr. Emerson served as Secretary from 1950 to 1957 and is currently serving as an Associate to the Executive Committee.

### Mighty Radio Transmitter Powered By Diesel

The Jim Creek Naval radio station located 55 miles from Seattle, Wash., is the voice of command for all U. S. Navy ships. The 14-month old station can flash commands to our submarines beneath the water, Arctic outposts, ships and aircraft.

Standby power for the giant transmitter is furnished by a 16-cyl, SW14, vee-type, 3600-hp Worthington diesel, driving a 2500-kw, 450-rpm, 4160-v synchronous generator built by Electric Machinery Mfg. Co. To insure that the unit is ready at all times, it takes on the entire load one day per week. When the station is "keyed," a load of 1700 kw is instantly placed on it. Yet voltage variations are held to within $\pm 2\%$. It has performed this tough duty well and with only routine maintenance.



### LeTourneau Re-Enters Earthmoving Field

After a five-year absence R. G. LeTourneau, Inc., will again take up its earthmoving activities. However, it will be several months before the company can say what the first machines will look like or what they will be able to do.

It is anticipated that the "electric wheel" power system developed for LeTourneau's gigantic non-earthmoving machines will be introduced to earthmoving. This system uses electric motors geared directly to the centers of every individual wheel of a machine and to all its other points where power is used.


new products . . Page 44

people and plants . . . Page 48

new literature . . . . Page 50

### Diesel Injection Sales & Service Now Hartridge Distributor

Diesel Injection Sales & Service Inc., Norfolk, Va., has been appointed exclusive distributor in the U. S. for Leslie Hartridge, Ltd., England. Hartridge is one of the world's largest manufacturers of fuel injection test and service equipment.

Diesel Injection Sales & Service is one of the largest firms in the country specializing in Sales and Service of fuel injection equipment, governors and allied products. They have four branches in Virginia and North Carolina.

As American distributor, Diesel Injection Sales & Service, Inc., will offer the full line of Hartridge equipment on a national basis. This line of equipment includes nozzles, analyzers, testers, reconditioning equipment, fuel pump test benches, calibrators and service equipment.

### ICEI Elects Officers

L. F. Shoemaker, Allis-Chalmers Mfg. Co., has been elected president of the Internal Combustion Engine Institute. He succeeds F. C. Langston, Jr., of the P & H Diesel Engine Div., Harnischfeger Corp., who continues as a director. Other officers for 1958 include Cmdr. A. D. Marks, Hercules Motors Corp., vice president; H. H. Howard, Caterpillar Tractor Co., treasurer; and J. V. Doe, Willys Motors, Inc., secretary.

### New Aluminum Alloy Brings Aluminum Engines Closer

A familiar, but rarely used, aluminum casting alloy may be the ideal metal for tomorrow's all-aluminum automotive engines. The alloy is aluminum, with more than 20% silicon added.

The Aluminum Co. of America has developed foundry techniques plus improved cutting tools which make it possible to cast and machine this super-hard alloy with comparative ease.

Low expansion and high wear-resistant qualities of the "hi-si" alloy make it a definite possibility for an all-aluminum engine.


Snap-on

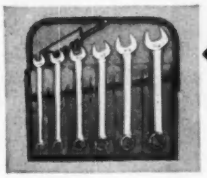
COMBINATION WRENCHES

The Busiest Tools in the Shop

IMPORTANT FEATURES

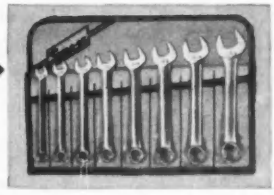
1. Choice of long or short handles.
2. Boxocket® broached to give clean, sure-gripping walls.
3. Chamfered opening aids in placing over nut.
4. Accurately centered opening gives walls equal thickness and strength.
5. Easy-gripping handles have no sharp edges.
6. Open end is set at 15-degree angle — turns nut with 30-degree handle movement.
7. Slim heads slip into tight spots.
8. Pear-shaped jaws handle close-quarter work.
9. Opening has rounded bottom — helps prevent breakage.
10. Same size opening at both ends.

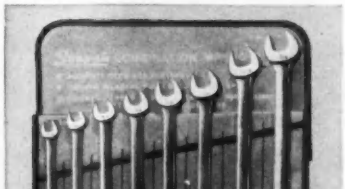
3 POPULAR SETS • OTHER SETS AND EXTRA LARGE SINGLE WRENCHES AVAILABLE



**Angled-clearance offset** — 6-wrench set from 5/16 to 5/8-in. openings. Also individually.

**Close-quarter short handle** — 8-wrench set from 5/16 to 3/4-in. openings. Also individually.



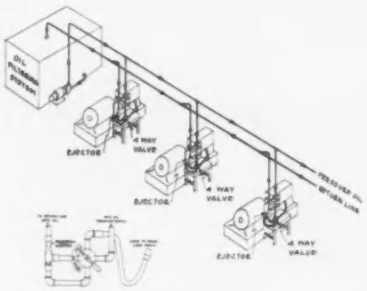


**High-leverage, long handle** — 8-wrench set — sizes from 7/16 to 7/8-in. openings. Also 12, 15 and 18-wrench sets or individually.

*Snap-on branches and warehouses are located in key industrial centers throughout the U.S. and Canada.*

SNAP-ON TOOLS CORPORATION

8064-F 28th Avenue • Kenosha, Wisconsin



### Ejector Solves Crankcase Drainage

A diesel testing installation required a system to provide each test stand with lube oil under pressure, also a method of rapid crank-case drainage.

The simple system devised, uses oil pressure available at each test stand to drive a Penberthy ejector. A 4-way valve in the system permits the crankcase to be drained or filled through the same drain connection by manipulation of a single valve.

C.A.V.

Depots and Service Agents in over 100 Countries

FUEL INJECTION EQUIPMENT DIVISION
of
LUCAS ELECTRICAL SERVICES, INC.
Head Office: 501 West 42nd Street, New York
Sales Office: 14820 Detroit Avenue, Cleveland 7, Ohio
West Coast: 5025-29 W. Jefferson Blvd., Los Angeles 16, California
Canadian Distributors:
Joseph Lucas (Canada) Ltd., Head Office: 11 Davies Avenue, Toronto 8, Ontario
Branch Office: 3401 St. Antoine Street, Montreal 30, Que.
A.P. 174817

### American MARC Gets Order for 2000 Diesels

American MARC, Inc., has received a contract for about $2 million from the U. S. Defense Dept. The order is for nearly 2000 air-cooled, 1-cyl, 6½-hp and 2-cyl, 13½-hp diesels.

This is the first contract received by American MARC since these engines were standardized as commercial type military equipment. The engines will be used as portable power packages and prime power for electronic installations. Production will begin immediately, with completion by early 1959.

### Maintenance Costs Are Higher When Anti-Freeze Drainout Is Ignored

To avoid expensive repairs and breakdowns of valuable equipment, cooling system experts strongly recommend draining out last winter's anti-freeze solution. This includes the so-called "permanent" types. As applied to anti-freeze, "permanent" means "for the entire season," not year after year.

It is a proven fact that acids may form in all anti-freezes after one season. Corrosive solutions attack the cooling system, producing rust. This can clog the radiator and narrow water passages of the engine head and block. When the flow of coolant is cut, the engine quickly overheats with good possibility of serious engine damage.

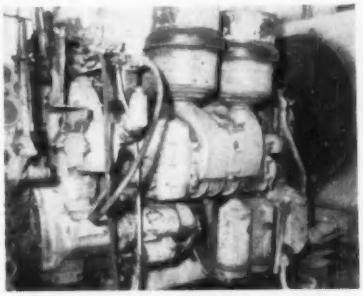
To assure efficient operation during hot weather, E. F. Harford, research supervisor for Du Pont's anti-freezes, recommends the following program.

1. Drain out and discard winter-worn anti-freeze solutions from the radiator and engine block.

2. Clean and flush the cooling system, using a chemical cleaner, if necessary.

3. Check hoses and other cooling system parts for leaks or wear; replace or repair where necessary.

4. Refill radiator with fresh water, and add a chemical rust inhibitor.



### Diesel Ruggedness Demonstrated

Ruggedness of diesel engines is again being demonstrated—this time in Texas. The Twin 6-71 GM unit sold to the Schlemeyer Drilling Company in 1952 was not new. It had seen quite a bit of service but it had been put through the Stewart & Stevenson remanufacturing process. This gave it new life.

The unit has been used constantly since 1952 with a small low-cost drilling rig. It has never had any major repairs until just a couple of weeks ago when Stewart & Stevenson put a remanufactured block assembly exchange unit on one of the twin engines.

### Hercules Buys Hall-Scott Engine Div.

Hall-Scott Inc. has been purchased by the Hercules Motors Corp. The purchase includes all inventory, certain machinery, tools, engineering data and use of the Hall-Scott name.

Hercules plans to build Hall-Scott 250 to 600-hp engines in their present plant facilities at Canton, O. They will also provide service for units in the field.

### Diesels Power Mountain Lift

The first "Telecar" system in the U. S. is carrying passengers to the top of 6800-ft Wildcat Mountain, N. H. A 12-cyl, 5⅛-in. bore, 6-in. stroke, Cummins NVH-IP, 425-hp, 2100 rpm, engine furnishes power for the lift system.

The unique skier and sight-seer lift features 96 gondola-type cars which transport 600 persons per hour to the top of the mountain. A passenger can reach the top in 10 minutes.

### Iceland Construction Men Tour Factory Schools Here

After completing nine weeks of training in nine American factory schools, nine operator-mechanics from Iceland returned to their home construction jobs. The courses were arranged through the U. S. International Cooperation Administration. Sessions covered operation and maintenance of dozers, earthmovers, excavators, asphalt and rock crushing plants and the diesel engines used by the Iceland contractor.

### *Correction*

Models 6G-825 and 8G-825 Superior diesels made by the White Diesel Engine Div., The White Motor Co., inadvertently appear twice in the 1958 engine listings published in the April issue of Diesel Power. Since the data on these Models given on Page S-11 is not completely correct, draw a line through them. Use the listings for these Models given on Page S-12. These are completely correct.


ROCKFORD

LONG LIFE
Heavy-Duty
POWER
TAKE-
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PERMITS
HEAVIER
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No Pilot Bearing
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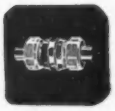
40,000 Hour Main Bearings

Small Spring Loaded

Heavy Duty Spring Loaded


Oil or Dry Multiple Disc

Heavy Duty Over Center

Power Take-Offs

Speed Reducers

This new Oil Field type ROCKFORD POWER TAKE-OFF handles belt loads up to and including 5,000 pounds. Standard commercial sheaves can be used. You can add to the belt-load capacity of *your* equipment by specifying this ROCKFORD Long-Life, extra Heavy-Duty POWER TAKE-OFF.

BW SEND FOR THIS HANDY BULLETIN
Gives dimensions, capacity tables and complete specifications. Suggests typical applications.

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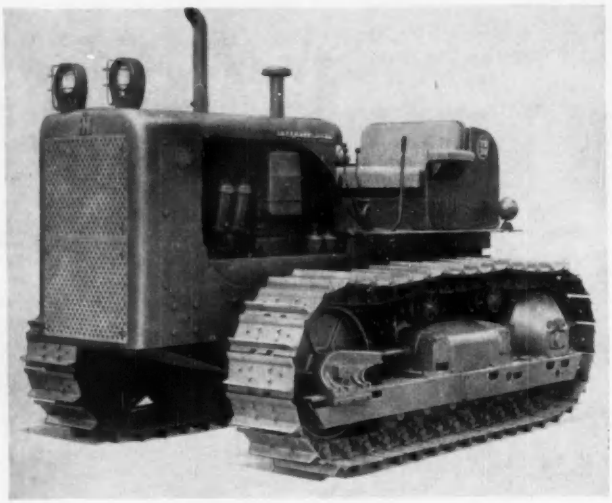
Export Sales Borg-Warner International — 36 So. Wabash, Chicago 3, Ill.

CLUTCHES

# new products



### I-H's New Diesel Crawler Tractor

International Harvester Co. has a new diesel crawler tractor — the TD-20. It is powered with a 6-cyl, 4-cycle, D-691 diesel rated 134 hp at 1550 rpm. This engine can work at up to 45-deg with positive lubrication to all parts.

The TD-20 has speeds from 1.5 to 7 mph in forward and 1.8 to 8.4 mph in reverse. Its drawbar hp is 111 with a maximum drawbar pull of 27,500 lb in first gear at 1.5 mph. The 74-in. gauge tractor weighs 29,000-lb.

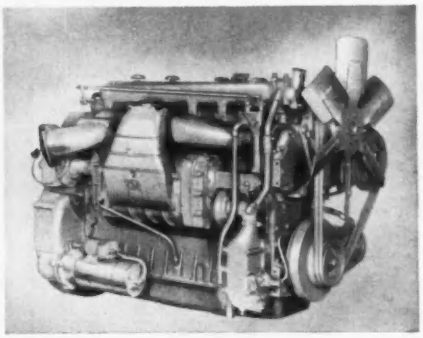
Its transmission can be shifted through six speeds with a single lever. A separate lever operates the forward-reverse "shuttle bar" control which provides six speeds forward and six in reverse. Dozing cycle time is reduced, since operators doze forward in second gear and return in third or fifth gear.

### GM's 71-E Truck Diesel

GM's Detroit Diesel Engine Division's latest is a 1710-lb Model 71-E truck diesel. It is said to be 750 lb lighter than any diesel in the 210-hp range. Its low weight is attained through liberal use of aluminum alloys in the cylinder block and other major components. This permits a substantial increase in truck payload capacity and higher average road speeds.

The new 6-cyl unit retains all the durability features of GM diesel standard cast iron models. It has the 4-valve head, high-economy fuel injectors and pistons which further improved the Series 71 engine performance.

The unit's peak 210 hp is at 2100 rpm. Its maximum torque of 577 lb ft is at 1200 rpm.



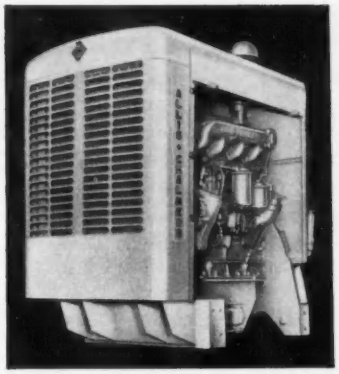
### Overspeed Governor Mounts On Tachometer Drive

A new overspeed governor body style is now available for mounting directly on a standard SAE tachometer take-off. This unit, made by Synchro-Start Products, Inc., eliminates the need for a flexible drive cable.

The shank of the unit is 1-⅛-in. hex with ⅞-18 internal threads for mounting. A tongue drive shaft floats so as to compensate for possible misalignment. This is available in diameters of 0.187-in. or 0.152-in.

This new body style is available for Synchro-Start's complete line of speed-sensitive switches. These include, overspeed, underspeed, two-switch and three switch governors.

The unit shown, is essentially a single-element, speed-sensitive switch with either manual or automatic reset. It will open or close a set of contacts when operating speed increases to dangerous proportions. Standard governors can be furnished for operation between 500 and 6000 rpm.



### Allis-Chalmers Expands Diesel Line

Two new diesel power units have been added to the engine line of the Engine-Material Handling Div., Allis-Chalmers Mfg. Co. They are the 88-hp Model D-344, and the 131-hp Model D-516.

Both engines are designed to serve a wide range of power requirements in the construction and oil fields; for irrigation; in sawmills and crusher plants; for OEM equipment, generator sets, and in other fields where heavy-duty general utility power units are adaptable.

These high-torque engines provide a steady output at speeds from 1000 to 1800 rpm. The D-344 is a 4-cyl and the D-516 is a 6-cyl engine. The Allis-Chalmers follow-through combustion system with its low peak pressures and simplicity of design gives fuel economy and low operating cost.

These basic engine assemblies have been field proven through extensive use in the Allis-Chalmers HD-6 and HD-11 diesel-powered crawler tractors.

### Gasketing Material Without High or Hard Spots

A new rubber-asbestos material introduced by F. D. Farnam Co. is called Kaobestos, This material is said to have improved conformability, and tighter sealing qualities with minimum flange loadings. It has a wide range of applications on diesels, heat exchangers and compressors. Among the unique features of this material are reported the absence of high and hard spots.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Factory-Certified Exchange Crankshafts give Trouble-Free Operation for the Full Life Cycle of Your Diesel Engine

**Morco** dealers — coast to coast — are stocked with reconditioned, like-new crankshafts for different diesel engine models. Users of Detroit Diesel and Cummins engines can exchange worn shafts for MORCO factory-reconditioned shafts through authorized dealers.

Why take chances? Let your dealer be your source for dependable, safe crankshaft regrinding. You get immediate service, guaranteed quality and terrific economy. Ask your dealer about MORCO today.

Look what Morco's

**complete reconditioning service offers you!**

**Magnaflux**—six separate magnaflux inspections with latest equipment.

**Ground** on production type equipment to engine manufacturer's specifications. Original stroke retained.

**TOCCO* Induction Hardened** by the original equipment method when necessary.

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**Thrust Collars** and surfaces repaired.

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**Key Ways** restored.

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**Oil Seal** surfaces renewed.

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*TOCCO is a registered trademark of The Ohio Crankshaft Co.

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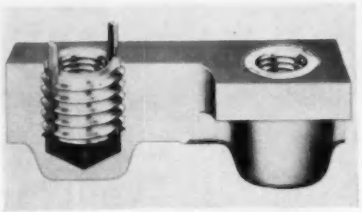
## new products

### Improved Lube Oil Filter Announced

An improved-design lube oil filter for heavy-duty diesels is available from DeLuxe Products of Racine, Wis. The new filter is called Graduflo HL and HS. In addition to this filter housing, DeLuxe is introducing a Graduflo Cartridge which operates in the housing.

Special features of the filter housing, include an all-weather relief valve which lets oil warm up rapidly and insures even pressure inside the filter regardless of pressure developed. Specially-placed removable inlet ports admit oil without agitating accumulated sludge in the sump.

Filtering media is staple cotton fibers that are said to absorb 5.25 times their own weight in contaminents—including acids, moisture, suspended particles and colloidal impurities.



### Self-Locking Threaded Insert

Newton Insert Co. now offers "Keensert," a new easily-installed, self-locking threaded insert. It is designed to provide a strong internal thread for bolt attachment in relatively soft materials, such as aluminum and magnesium alloys. It may also be installed in the harder metals to provide a self-locking internal thread in a blind hole.

Keenserts are externally threaded along their entire length to provide maximum pull-out resistance. Positive mechanical resistance to rotation is provided by the Keensert Kees, which are tightly fastened in the Keensert and are easily pressed into the base material with a small punch and hammer or a simple installation tool.

### Tool Line Expanded

The X-4 Corp. has added a larger wrench to their line of geared head wrenches and a line of large socket wrenches. The new model TD-1500 rated at 400 ft lb with a 1-in. input drive and 1½"-in. output drive has all of the features previously announced in their smaller models TD-750 and TD-1000.

### Triple-Action Cleaner Speeds Parts Cleanings

A triple-action parts cleaner developed by the Research Laboratories of Gumout Div., Pa. Refining Co., is called S-P-D Parts Cleaner. It combines solvent, penetrant and detergent action for fast cleaning of all types of metal parts.

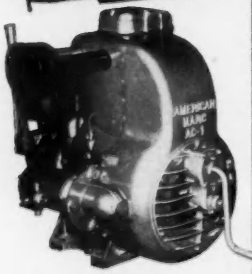
The maker says the solvent action dissolves and completely removes accumulations of gum, varnish, oil and grease. The penetrant action pierces and lifts the hard caked-on deposits. The detergent action floats away common dirt, soil and grime.


*Rugged—Dependable—Economical*

AMERICAN MARC DIESEL ENGINES

*by America's largest manufacturer of AIR-COOLED DIESELS*

Model AC 1



Air-cooled, one-cylinder, four-cycle. 6.5 BHP @ 1800 RPM. Wt.: 220 lbs.

Model AC 2

Air-cooled, two-cylinder, four-cycle, V-type 13 BHP @ 1800 RPM. Wt.: 350 lbs.

Model WC 2M

Water-cooled, two-cylinder, four-cycle, V-type Marine, 15 BHP @ 1800 RPM. Wt.: 350 lbs.

Model A 2PM

5 to 7.5 KW permanent magnet generator mounted to AC2 diesel engine. Wt.: 550 lbs.

American MARC lightweight Diesel engines deliver dependable power regardless of operating or climatic conditions. These rugged Diesels function economically through service-free periods far exceeding their guarantees. The four basic models have found world-wide application furnishing lightweight power for material-handling cars, road rollers, refrigeration units, cement mixers, power plants and auxiliary motive power.

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DIESEL ENGINES
Dept. P-68
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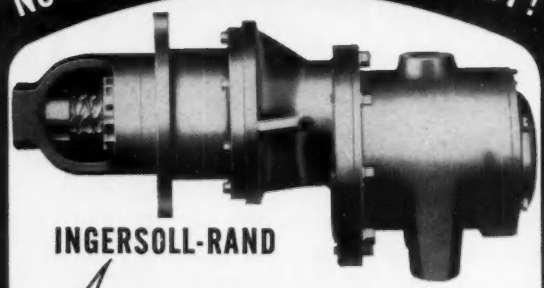
1601 West Florence Avenue,
Inglewood, California

AMERICAN MARC DIESEL ECONOMY AND AMERICAN MANUFACTURING TECHNIQUES



NO BATTERIES TO WORRY ABOUT!



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*Air* STARTING MOTORS

give you trouble-free engine starts

**RELIABLE**—I-R Air Starting Motors are built for fast, sure engine starting—anywhere.

**LOW COST**—No batteries, generators or electrical parts to buy. Practically no maintenance expense.

**COMPACT**—I-R Air Starting Motors are lightweight, small but powerful. For all popular gasoline and diesel engine sizes. Easily installed.

*Ask your engine distributor to show you the I-R Air Starting Motor line. Or write for Bulletin 5094A.*

18-512

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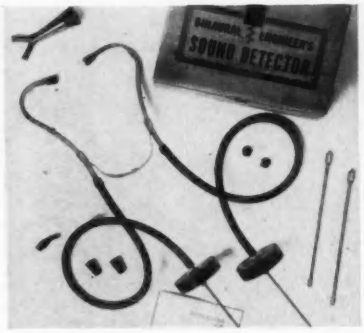



### Improved Mechanical Sound Detector

A new, Binaural Engineer's sound detector is said to locate the smallest internal defects in moving machinery without shutting down or taking equipment out of service.

It amplifies normally inaudiable defect-caused noises and helps to accurately locate broken, loose, worn or bent parts in engines, gear boxes, pumps, etc. It is also useful for locating leaks in air, gas or liquid lines.

Dual detectors make it possible to listen to two different points at the same time, thus pin-pointing defects quickly and accurately.

### "Quicktest"—Dial Caliper Gauges

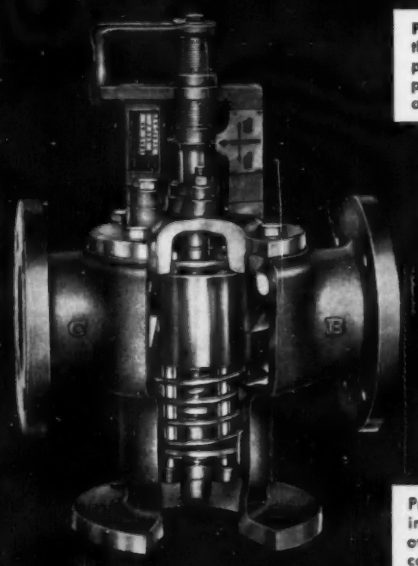
The "Quicktest" dial caliper gauges are precision instruments for measuring thickness of sheet metal, pipe walls, profiles, grooves, threads, etc. They are available as external and as internal gauges. Rapid yet accurate measurements may be made by holding the gauge in one hand, leaving the other free to hold the specimen.

The gauges consist of the measuring mechanism and two protruding shanks. The lower shank is rigid, while the upper shank is pivoted mobile inside the gauge case. Its deflection is transmitted to the pointer. The contact points at the extremities of the shanks make close contact with the specimen. Four shapes of contact points are available for various measurements. The instrument is made by the Bemex Import-Export Co.

(*Continued on Page* 58)


# ALL-IN-ONE CONTROL FOR HIGHER ENGINE EFFICIENCY

By controlling cooling water or lubricating oil temperature, this Sylphon Engine Control guarantees the engine temperature you need for maximum operating efficiency—minimum fuel consumption. And best of all, it detects temperature changes and adjusts valve openings as *one complete unit—from one location.*



**POWER-PILL*** fusion-type thermal element provides powerful response to temperature changes only. Not affected by pressure.

Tamper-proof . . . factory set for any specified operating temperature between 120° and 190°F.

Entire operating mechanism lifts completely out of the valve body. No breaking of pipe connections if servicing is ever required.

Protected against damage in case of temperature over-run. Simple, rugged construction minimizes servicing and maintenance.

SYLPHON ENGINE CONTROL
No. 1280 shown here has manual operator, No. 1281 does not. Manual operator over-rides thermal element and permits valve to be opened or closed at any time.

Valve body and other parts are corrosion-resistant. Valve sizes 2" through 6", pressures to 150 psig.

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CONTROLS COMPANY

FULTON SYLPHON DIVISION • Knoxville 1, Tennessee

# people and plants

R. E. Gottron

## Hercules Names Foreign Sales Mgr.

R. E. Gottron, one of the nation's early airmail pilots and an experienced export executive, has been appointed manager of foreign sales of Hercules Motors Corp.

He joined the Hercules engineering department in 1936 and later was transferred to sales engineering. During the World War II he served as inspection officer at the Los Angeles Base Shop of the U. S. Army Ordnance Dept. with the rank of major. He has been connected with the foreign division of Hercules since his release from the army.

J. F. Bushnell

## New Roosa Master Sales And Service Engineer

J. F. Bushnell has been appointed sales and service engineer for the Fuel Injection Div. of Hartford Machine Screw Co. in the Great Lakes and Mid West area. His responsibility will cover customer contact on all phases of the Roosa Master fuel injection pump including design, development and related engineering matters. He joined Hartford Machine Screw Company in 1946.

D. L. Gallogly

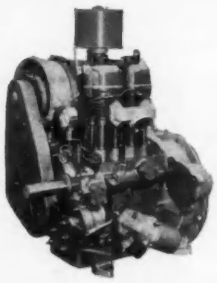
## Cooper-Bessemer Chief Engineer

The promotion of D. L. Gallogly to chief engineer at The Cooper-Bessemer Corp. has been announced. In his new capacity he assumes responsibility for the supervision of all engineering divisions of C-B, under the immediate direction of R. L. Boyer, vice president and director of engineering.

Reporting directly to Mr. Gallogly will be the chief engineers of the company's three engineering divisions, namely: T. O. Kuivinen, chief engineer Technical Div., R. F. Kymer, chief engineer Products Div. and W. R. Crooks, chief engineer Development Div.


**INTRODUCING A NEW LIGHTWEIGHT AIRCOOLED DIESEL ENGINE**

Dumper powered by a PETTER 12.5 HP PC2 diesel engine.



The PC, an addition to the current range of PETTER engines, is manufactured in 1, 2, 3, and 4 cylinder configurations at a continuous speed of 3000 RPM and a horsepower rating of 6.25 per cylinder.
Now the right prime mover is available for concrete mixers, pumps, forklift trucks, dumpers, air compressors, cultivators, balers, combine harvesters, cranes, conveyors, refrigeration equipment and many other applications.

**Air & Water-cooled diesel engines 3 to 200 HP**

**Diesel powered generating sets 1½ to 120 KW**

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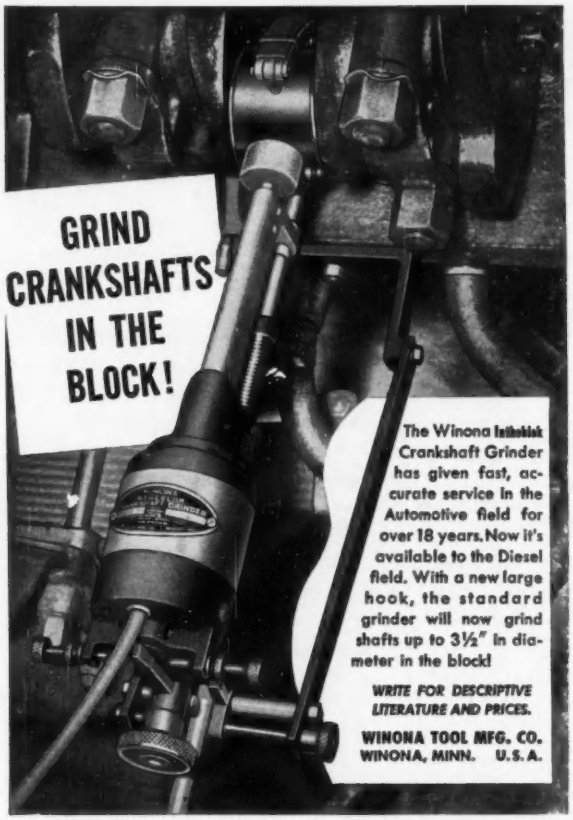
EXCELLENT SERVICE FACILITIES

PETTER ENGINE DIVISION — BRUSH ABOE, Inc.

34-14 58th Ave., Woodside, L. I., New York. DEfender 5-7100


GRIND CRANKSHAFTS IN THE BLOCK!
The Winona Istikslok Crankshaft Grinder has given fast, accurate service in the Automotive field for over 18 years. Now it's available to the Diesel field. With a new large hook, the standard grinder will now grind shafts up to 3½" in diameter in the block!
WRITE FOR DESCRIPTIVE LITERATURE AND PRICES.
WINONA TOOL MFG. CO.
WINONA, MINN. U.S.A.

KIENE®
DIESEL
indicator valves
OPERATES AT PRESSURES UP TO 10,000 PSI
Kiene valves have effective gas seal both open and closed without packing or glands. Operate against pressure — will never blow open. Small and rugged — 4¼" in length with only 3¼" circle of space for attachment. Kiene valves give better service under the most severe conditions. Standard indicator plug and wing nut connection.

Furnished with male ½" NPT engine connection. Other threads on order. Adaptations for most diesel locomotive engines.
SEND FOR BULLETIN V-10
KIENE DIESEL ACCESSORIES, INC.
10352 PACIFIC AVE., FRANKLIN PARK, ILLINOIS

### Contract Mfg. Div. Announced By Minneapolis-Moline

Making what is referred to as a "forward step" when many other industries are retrenching, Minneapolis-Moline has announced organization of a Contract Mfg. Div. The new division will serve other manufacturers and suppliers in production of forgings and castings, sheet metal, welding, automatic screw machine, and general machine products, as well as in research and development projects.

### New Officers For Stratoflex

Stratoflex, Inc., Fort Worth, Tex., manufacturer of fittings and hose assemblies, has announced its new officers.

These are: K. W. Davis, president and general manager; D. H. Thornbury, vice president; C. A. Thomas, vice president—sales; John Tullis, vice president—manufacturing; R. O. Moore, chief auditor; W. E. Strittmatter, secretary-treasurer; Byron Scarborough, assistant secretary; B. L. Coontz, assistant secretary; and W. B. Hague, assistant treasurer.

### Utica Div., Curtiss-Wright Corp. Appointment

J. C. Hammelef is the new industrial sales mgr. for Mercedes-Benz diesel engines according to Mr. W. A. Martin, director of sales, Utica Div. of Curtiss-Wright Corp. In his new position he will direct Mercedes-Benz diesel sales for all industrial applications.

Mr. Hammelef joins the Utica Div. after 25 years with the Chrysler Corporation's Industrial Engine Div. as director of the Marine and Industrial Engine Div. and as sales mgr. of the Industrial Engine Div.

### Con Diesel Creates New Post

G. Rosenberg, a director and vice president of Consolidated Diesel Electric Corp. has been elected to the post of group vice president. This is a newly-created post and entails responsibility for Con Diesel's Aircraft, Power, and Test Equipment Divisions, as well as for the Company's expanded activities on the West Coast.

### In Memorium

John A. Obermaier, founder and president of Illinois Testing Laboratories, Inc., died May 19, 1958, of a cerebral thrombosis. He was 68 years old.

Mr. Obermaier started the I.T.L., manufacturers of "Alnor" scientific and industrial instruments, in 1914 and directed its growth until he died.

The trade name "Alnor" was derived from the first halves of the names of his two sons, "Alfred" and "Norman."

### Euclid Appoints Regional Manager

The appointment of D. B. Currence as Southern Regional Manager has been announced by J. W. Bloomquist, domestic sales mgr. of the Euclid Div., G. M. Corp. Currence replaces C. B. Pace who resigned to establish a Euclid dealership in Kansas.

(*Continued on Page* 52)

# new literature

### Compact Heat Exchanger

A 12-page illustrated bulletin describing its new Fin-Pak heat exchanger has been issued by The Air Preheater Corp. The Fin-Pak can operate with low-pressure drops. The unit is suitable for operation under high pressure differentials for gas to gas, gas to air, or gas or air to liquid cooling.

Flow-diagrams are given of five Fin-Pak applications: for diesel or gas engines; for open-cycle gas turbines; for gas-cooled reactors and closed-cycle gas turbines; as a waste-heat boiler; and in chemical processing applications.

### Scrubber Removes 99.5% Of Solids Or Liquids In Gas

A technical data bulletin #500 on how the Centrifix WD scrubber removes 99.5% or more of all solid or liquid entrainment in gas or vapor is offered by Centrifix Corp. Design variations make it possible to apply these snubbers to equipment in petroleum refineries and gas processing and transmission among others.

Included in this 4-page brochure are cut-away views of WD scrubbers which shows how gas or vapor is first scrubbed and then dried as it passes through with minimum pressure drop.

### Engine-Driven GE Generators

Engine-driven, synchronous generators up to 450 rpm, for municipal power plants and industries' power needs, are described in General Electric Company's bulletin (GEA-5299B).

Reduced downtime and longer generator life is attributed to Polyex, a material which provides maximum compactness and homogenity of insulation walls.

A new one-piece brush holder gives constant uniform brush pressure and offers 50% longer wearing length. Spring pressure adjustment is eliminated and sticking and chattering are avoided.

### Clayton Dynamometer Line

Three basic types of dynamometers are produced by the Clayton Mfg. Co. for testing engine horsepower. The first consists of chassis dynamometers which measure road horsepower of vehicles. Second is the engine dynamometer which measures horsepower of engines mounted on engine testing stands. Third is a universal tractor power take-off testing equipment. This latest type measures horsepower from power take off mechanisms on tractor equipment. All are described in a set of bulletins now available.

### Folder Of Marman Brochures

A file folder of 2-color brochures covering its line of clamps, couplings and joints for industrial uses is available from the Marman Div. of Aeroquip Corp.

The brochures provide detailed information on applications, sizes, and dimensions of products. They are illustrated with photographs and dimensional diagrams. Installation instructions are also included.

### Allis-Chalmers Bulletins

Allis-Chalmers has published the following series of bulletins.

A 14-page catalog (MS-1289) pointing up features of the HD-16 diesel crawler tractor is available from the Construction Machinery Div., Allis-Chalmers Mfg. Co.

Also available are two "spec" sheets. One (MS-1284) covers the HD-16 DC and D crawler tractors; the other (MS-1296) covers the HD-6E crawler tractor.

An 8-page catalog (MS-1234) covering the construction and operating features of the HD-6G tractor shovel and a list of interchangeable attachments available has also been issued.

Catalog BU-451 covers the FT series of lift trucks, telling the construction and operating story of the units.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### Temperature Controls Catalog

A temperature control catalog is now available from the United Electric Controls Co. Designated as "Condensed Catalog 400," this 8-page catalog describes local-mounted and remote bulb temperature controls. It includes general purpose, dual switch, explosion-proof and indicating type units.

### Reinforced Teflon Parts

Complete facilities for the design, compounding and molding of packings, gaskets, bearings, square rings and other component parts made of reinforced "Teflon", are now in operation at the special elastomers plant of Chicago Rawhide Mfg. Co.

A 4-page illustrated bulletin describing many of the chemical, thermal, mechanical and frictional advantages of "Teflon" and reinforced "Teflon" parts may be obtained by using the Reader Service Card.

### Tachographs Promote Efficiency

A Wagner Electric Corp. bulletin called "A Supervisor in Every Cab" details functions and use of their tachographs. These are precision instruments that record operating events on a round, wax-coated paper chart revolved by a clock as events are inscribed.

A full record of a trip or period of operation is then available for analysis. Compiled on a weekly analysis sheet, the operation, whether on- or off-highway, can be studied. Operating habits affecting safety, driving economy and maintenance costs can be determined and corrective action taken. Routes or cycles of operation can be studied for more efficient operation.

Two models are available, the "AA" and "BB". Both record data in reference to time. For example, engine operating periods as well as trip or cycle time is shown. Model AA records in terms of vehicle speed (mph) and total mileage. Model BB records in terms of engine rpm and total revolutions. Both models may be installed for a complete record of operating events.

### Selection And Application Of Automatic Transfer Switches

How to select and apply an automatic transfer switch, are covered in a new booklet issued by the Automatic Switch Co.

Publication 596R1 discusses such requirements as inrush capacity, continuous duty rating, rapid transferral of load, high thermal capacity, ability to withstand electromagnetic effects, double source control, full phase protection and various structural and operational features.

### High Pressure Hose & Tubing

A 32-page Technical Bulletin No. 200 on high pressure hose and tube assemblies made by the Eastman Mfg. Co. offers a new approach in helping purchasing agents and design engineers meet specifications for increasingly higher pressure requirements.

Nine major sections of this bulletin are devoted to couplings suited to all types of hydraulic applications.

(*Continued on Page* 55)

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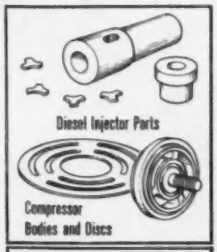

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## *people and plants*

(*Continued from Page 49*)

S. T. McFadden

### Cummins Distributor Gets Fleet Sales Representative

S. T. "Mac" McFadden has joined the Cummins Diesel Michigan Inc. organization as Fleet Sales Representative. He will work jointly with manufacturers of Cummins diesel powered equipment and their large fleet customers.

"Mac" was formerly associated with Reo Motors, Inc., and with the White Motor Co.

### Changes At Lengor

The Lengor Co. of Annapolis, Md., exclusive manufacturers of the Simplex Oil Testing Kit, has appointed Mr. Harold Sharp national sales manager. He will be responsible for the sale and promotion of the oil testing kit within the U. S. The Essential Service Units, Inc., N. Y. C., have been appointed as Lengor's overseas division. They will be responsible for the sale and promotion of the kit overseas.

### Wilson Supply Co. To Distribute Witte Oil Field Engines

Wilson Supply Co. will distribute the complete line of "Oilwell" drilling equipment and the Witte line of oil field engines through its 20 domestic branch stores and nine district sales offices. This was announced jointly today by F. F. Murray, president of the Oil Well Supply Div. of U. S. Steel Corp., and W. D. Wilson, president of Wilson Supply Co. The new arrangement marks an extension of U. S. Steel oil field products which Wilson Supply has marketed for many years.

### Delco Remy Expands Sales Staff

Five new posts on the sales staff of the Delco-Remy Div. have been announced as part of a program to expand the Division's marketing and merchandising activities throughout the country.

Named to the new positions are: J. D. Baker, assistant general sales manager responsible for the planning and direction of original equipment sales activities. Dan T. Fisher, assistant general sales manager responsible for all replacement and after-market sales and service. F. A. Stinson, manager of Detroit regional sales, where a new office is to be established at a suburban location. F. R. Hubler, manager of Anderson regional sales, responsible for original equipment sales with Delco-Remy customers outside the Detroit area. D. E. Pearson, manager central sales office, responsible for price and market analyses, order handling and sales office administration.

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## new literature

(*Continued from Page* 51)

### Miehle-Dexter Supercharger Boosts Power Up to 50%

A 4-page folder demonstrates the operating advantages of pressure range, size, weight, cost and service of the Miehle-Dexter supercharger for internal combustion engines. It is issued by the Miehle-Dexter Supercharger Div.

Operating at pressure ranges from 1 to 12 psig., the M-D supercharger boosts power up to 50% in normally-aspirated engines rated 100 to 750 hp. Capacities range upward to 2500 cfm.

### Flexible Connectors For Corrosion Resistance And High Temperature

Bulletin UC 3 released by the Universal Metal Hose Co. gives specifications and prices on their line of bronze flexible connectors. These connectors are used to simplify misaligned hook-ups and compensate for expansion or vibration.

They are designed for gases or fluids at temperatures up to 400°F. They are said to be completely leak proof and highly corrosion resistant. The outer cover is braided for extra strength.

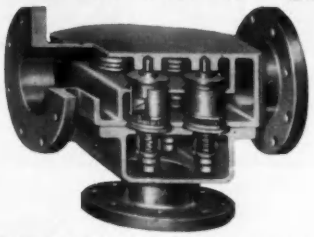
### Small Flexidyne Drives And Couplings With Advantages Of Larger Sizes

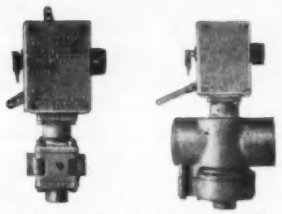
A fractional horsepower unit with all the advantages of the larger sizes Flexidyne dry fluid drives and couplings have been added to the Dodge Mfg. Corp. line.

These compact, economical drives and couplings are identified as 5D and 5C. They are designed for ¼, 1/3, ½ and ¾-hp motors at 1750 rpm. They are recommended for light machines subject to jam-ups or to enable small motors to handle heavy starting loads. A new two-page bulletin A-665 describes them.

(*Continued on Page* 57)


# AMOT ENGINE CONTROLS





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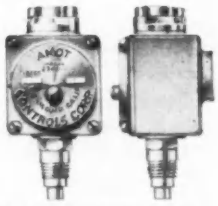


**VENTED GAS VALVE,** diaphragm operated will shut off the fuel gas and vent the manifold when used on internal combustion engine applications. Made in 2", 3" and 4" sizes.

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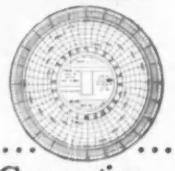

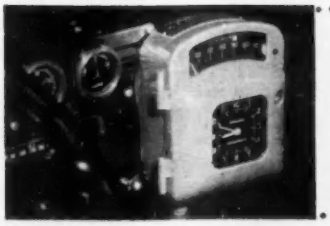

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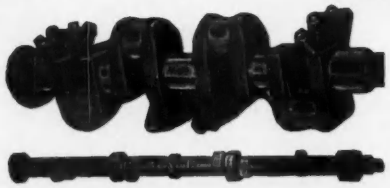

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## new literature

(*Continued from Page 55*)

### Dredges Described

Six basic types of dredges are described and illustrated in the new 12-page bulletin, #925, offered by the Ellicott Machine Corp.

Photographs, profile line-drawings and text material detail the grapple, dipper, bucket, plain suction, self-propelled hopper, cutterhead pipeline types and the "Dragon" ® portable hydraulic dredges.

Data is given on applications, such as highway construction, land reclamation, canal digging, flood prevention, sand and gravel production, etc.

### Asco Solenoid Valves Stock List & Selection Guide

The Automatic Switch Co., designer and manufacturers of ASCO solenoid valves, has prepared an 8-page stock list on valves available for immediate delivery.

The new stock list contains prices, valve ratings, flow diagrams, illustrations, engineering data, etc. Sufficient ordering information has been provided.

### Handbook For Wire Rope Users

A handbook is available from the Wire Rope Corp. of America on the use and care of wire rope. It has 36 pages of useful information for everyone who buys, sells or uses wire rope. The book explains how to select the right rope for your specific needs; methods of socketing, splicing and installations; and important points on safety.

### Hose Clamp Literature

A 2-page catalog, A-458, by Wittek Mfg. Co., describes, illustrates and gives size diameters on: Sure-Tite, Solid Band, Auto Clamp, Strap-Tite, Noc-Out and Tubing Clamps for diversified application in industry.

### Pump Catalog Aids Selection And Application

A catalog, No. 109 published by the Tuthill Pump Co., contains complete information on their bronze positive displacement pumps. These are furnished from 2 to 50 gpm up to 400 psi pressure.

Included in the catalog are model selection charts, data on mounting styles, typical pump characteristic curves, and tables showing relationship of speed, capacity, pressure and power consumption. Complete ordering information on 61 models is given.

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## new products

(*Continued from Page 47*)

### Hercules Expands DD and GO Line

Hercules' new 3-cyl engine now supplements the 4- and 6-cyl diesel and gasoline engine models introduced last year. There are now 12 models in these three engine series (6 diesel and 6 gasoline).

Production of the larger engines provided Hercules with proved experience in applying the latest advances of engine design and manufacture to the 3-cyl unit. Interchangeability, economy in manufacture, greater flexibility, convenience in servicing and reduction in parts stocks for adequate field servicing, have resulted from the experience gained through acceptance of the 4- and 6-cyl models.

### ATI Offers New Mufflers

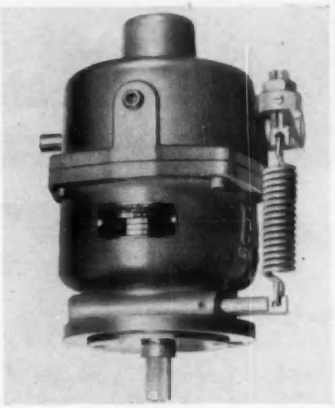
Three types of all-welded steel, heavy-duty "Engine-Mated" truck and bus replacement mufflers are now available from Alexander-Tagg Industries, Inc. The mufflers are suited for the range of cu in. displacement of engines in all makes of trucks.

They are said to meet recognized noise standards. Plus this they meet engine builder's, back pressure requirements. In this way, improved engine performance is obtained and heat problems due to excessive back pressure are eliminated.

### Proto Tool Makes Automatic Adjustable Wrench

"Clik-Stop," an automatic adjustable wrench, has been announced by the Proto Tool Co. It requires no adjustment other than simply turning the knurl as in the case of an adjustable wrench. There are no gadgets, no levers, no buttons. As the knurl is turned, jaw openings are held fast, and can't change position.

The wrench is available in the five most popular sizes, 4, 6, 8, 10, and 12-in. The tool is forged from fine alloy steel and chrome plated. Absence of a corner lip on the movable jaw (in most sizes) allows a square nut to fit flat to the inside jaw surface.



### Small Flyball Governor

Type 2300, a small, mechanical, flyball-type governor made by Farris Pickering Governor Co. is said to be capable of very accurate speed regulation.

The governor is used as the main speed control on small diesel and gasoline engines and also as an overspeed governor on larger engines.

Torque capacity for Type 2300 is 30 in. lb at 1200 rpm. Constant speed range is 500 to 2400 rpm; variable speed range 500 to 1440 rpm.

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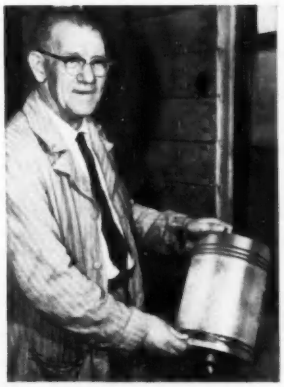
ENGINEER'S FIELD REPORT

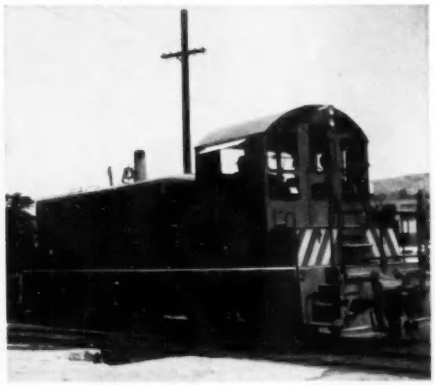
PRODUCT RPM DELO OIL RR

FIRM BAMBERGER RAILROAD CO.
Salt Lake City, Utah

# 5 years without overhaul on RPM DELO Oil

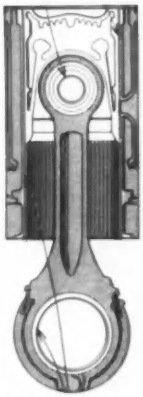
**Lubricated with RPM DELO Oil RR** since going into service, three switch locomotives of Bamberger Railroad have worked over five years without a major overhaul. "The oil does such a good job of protecting engines that I've never had to repair or replace a part because of faulty lubrication," says General Shop Foreman J. F. Buckley (below). "Every time we've opened the engines for inspection we've found them clean, free of carbon or lacquer deposits." Bamberger hauls general freight between lines of UP, WP, SP, and D&RGW over 36.9 miles of its own mainline track between Salt Lake City and Ogden.





**Clean piston** (above) has no measurable wear, shows the kind of performance Bamberger gets with RPM DELO Oil RR. "We simply wipe off parts and they're bright and shining," says Mr. Buckley. Firm's EMD 800's (#601 top right, #602 above) deliver cars to sidings and make up trains for larger locomotive—work an average of 16 hours a day. Engine #570 (top left) makes the Salt Lake–Ogden run, works 10 to 12 hours daily.

## Why RPM DELO OIL RR reduces wear, corrosion



- Oil stays on engine parts—hot or cold, running or idle
- Anti-oxidant resists lacquer formation
- Detergent keeps parts clean
- Special compounds prevent corrosion of bearing metals
- Inhibitor resists foaming

**For More Information** about RPM DELO Oils or other petroleum products of any kind, or the name and address of your nearest distributor, write or call any of the companies listed below.

LUBRICATING OILS RPM DELO

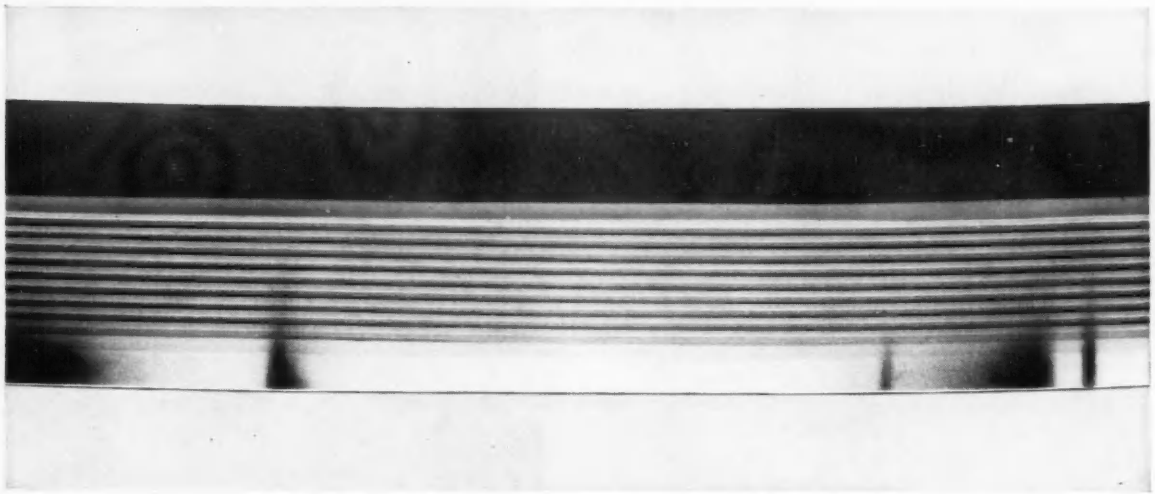
TRADEMARKS "RPM DELO" AND CHEVRON DESIGN REG. U.S. PAT. OFF.

**STANDARD OIL COMPANY OF CALIFORNIA**, San Francisco 20
**THE CALIFORNIA OIL COMPANY**, Perth Amboy, New Jersey

**STANDARD OIL COMPANY OF TEXAS**, El Paso
**THE CALIFORNIA COMPANY**, Denver 1, Colorado

# Reduce break-in time by as much as 80%!

## *with factory pre-seated full chrome* PEDRICK PISTON RINGS



*Bright highlight along lower face of ring shows area pre-seated by factory lapping.*

Use of PEDRICK Chrome Piston Rings reduces break-in time by as much as 80% . . . allows the engine to be put under full load very quickly. This is because PEDRICK laps or pre-seats its Chrome Rings to cylinder size *at the factory*. PEDRICK Chrome Rings are the most modern twist-seal and/or taper face designs, which further speeds seating and helps provide a quick, positive seal.

All PEDRICK Chrome Rings have a full Chrome coating. Chrome coating on a PEDRICK Ring is never less than .006 inches and may be as much as .010 or .012 inches thick depending upon the size of the ring and the use for which it is intended. On PEDRICK Chrome Rings, thickness of the Chrome coating is measured *after* the lapping operation.

PEDRICK Full Chrome Rings resist scuffing, withstand high temperatures, abrasion and corrosion.

Include PEDRICK top Chrome Rings in your replacement ring sets and increase ring life by as much as four times. A PEDRICK engineer will be glad to call and help you solve any special problems. Write, wire or phone: WILKENING MANUFACTURING CO., Philadelphia 42, Pa., SAratoga 9-3770.

**Pedrick PISTON RINGS**

**PEDRICK PIONEERED CONFORMABLE PISTON RINGS FOR BIG-BORE ENGINES**